**COMPARISON OF STUDENTS’ PERFORMANCES IN CONNECTIVIST AND TRADITIONAL CLASSES IN COLLEGES OF EDUCATION IN ADAMAWA AND TARABA STATES, NIGERIA**

**BY**

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**Abstract**

*This study aimed at comparing the mean score performance of students in connectivist and traditional classes and how gender affect their mean score. Two research questions and one hypothesis were answered in the study. Quasi–experimental design was adopted. The population for the study was 265 NCE III students and it consist of 139 male and 164 female students in Federal Colleges of Education Yola Adamawa state and College of Education Zing Taraba State, Nigeria. There was no sampling for this study because all Colleges of Education offering Business Education in the study area (Adamawa and Taraba State, Nigeria) were used. Kuder-Richardson formula 20 (K-R20) was used to determine the internal consistency of the instrument. The reliability coefficient for Business Communication Achievement Test (BCAT) was calculated and the result obtained was .952. The test scores were analyzed using mean to answer the research questions and t-test was used to test the hypothesis at 0.05 level of significance. The study found out that Students taught Business Communication using the connectivist model achieved more than the students taught using the traditional/conventional method. Also, Male students achieved more than the female students when taught using the connectivist model. Conclusively, the study recommends that Nigeria Commission of Colleges of Education (NCCE) should consider a review of Business Education curriculum with a view of incorporating connectivist teaching and learning model into the teaching of Business Education subjects particularly Business Communication and Colleges of Education in Nigeria should adopt the use of connectivism in teaching and learning of Business Education subjects most especially Business Communication.*

**Keywords:** Learning, connectivism and gender.

**Introduction**

Technology has forced changes in teaching and learning process and the major transformation in education today is as a result of advancement in technology. Tapscott in Hosea (2015) believed that the world is now in a digital era of learning and a transformation is taking place from sprayed learning to collective learning. To Tapscott, today's learners are not satisfied in becoming the passive recipients of the chalk and board teaching process, rather, they want to be involved in the learning process. Prensky (2005) and Hosea and Tunga (2018) all attested to the fact that today’s learners are no longer enthusiasm in or even happy learning in an environment that does not reflect their interest. Tapscott in Hosea and Tunga (2018) described today’s learner as net generation children and those before them as boomers. To Tapscott, thenet generation children are those children who in the year 2000 were between the ages of two and twenty-two and could force changes in communications and education and they are technologically proficient and processed information and learn differently than the baby boomers who were born between 1946 and 1964. Prensky in Arowolo (2014), described the net generation children as digital natives who belong to a generation that access free and open online documents, application and software, the generation that technology has transformed learning.

Learning is the acquisition of new knowledge or modification of an existing knowledge, behaviours and information that has brought about positive and desirable changes in one’s life as a result of previous experience. Driscoll (2000), defined learning as a persisting change in human performance or performance potential which must come about as a result of the learner’s experience and interaction with the world. Siemens in Hosea, (2015) defined learning as the formations and removal of connections between things that existed independently, or the movement or alteration of the strengths of those connections. Learning is a change in the way people acts or [conducts](http://www.oxforddictionaries.com/definition/english/conduct#conduct__8) them as a result of some intervention. The present study therefore, defines learning as the ability of an individual to receive and process sensory data, encodes and comprehends such data as memories within the neural structures of his/her brain, and retrieve those memories for subsequent use whenever it is required. Tapscott (1998) believes that technological revolution is permeating every aspect of human lives and it forces individual to examine the use of computer technology as learning devices. Delen and Bulut (2011) posited that the use of technology in schools was found to be a weak predictor of score especially in math and science. However, previous research proved that it may still have indirect impacts. Eskil, Ozgan, and Balkar (2010), in their study revealed that some classroom activities have positive effects on students’ technology usage. The authors believed that when students have advanced knowledge about technologies, they can be more successful in their studies. Therefore, direct and indirect effects of technology usage in school should be taken into consideration. To Kubiatko and Vlckova (2010), the amount of time individual spent using technology has a positive and strong relation with knowledge. Kim and Chang (2010) study math achievement gap between students coming from divers racial and ethnic backgrounds. They found that home computer usage reduces the gap in math achievement.

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Therefore, students’ technology use may explain the learning gap. Tapscott (1998) agreed that the new technological tools offer great promise for a new model of learning such as discovery and participation more especially in the learning environment. On Purpose Associates (1998), argued that learning environments should not be construed simply as the traditional formal classroom within the context of institutionalized public education. Such environments occur within the workplace, the home, and other social institutions as information and communication technology continues to penetrate and dominate the teaching and learning process. Siemens in Hosea (2015), posited that learning supposes not to be an individual activity. Knowledge is given and obtains across networks. In this digital world, the connections a learner makes within a network leads to learning. Therefore, learning needs and theories that describe learning principles and processes, should be reflective of the social needs.

Learning theories are used in describing how information are received, processed, and retained during [learning](http://en.wikipedia.org/wiki/Learning). Siemens in Hosea and Tunga (2018) viewed learning theory as literally a theory describing how individual connections are formed or adjusted. Bransford, Stevens, Schwartz, Meltzoff, Pea, and Roschelle (2006) posited that theories of learning can inform teaching and the use of different instructional resources including technology, but ultimately the learning activities in which the student actually engages (mental, physical, and social) determine what a student learns in the classroom. The authors believe that learning theories do not have to dictate how teaching should be done or have to influence the way learner learn. Siemens (2004), agreed that behaviorism, cognitivism, and constructivism are the three most use theories of learning in instructional delivery. To Siemens, these theories evolved at the time when learning was not technologically influenced. Over a decade, technology has reshaped learning process and thus introduced a new learning theory such as connectivism.

Connectivism is a learning theory which explained that learning does not take place in the brain, instead learners learn based on the level of the connection one has with the knowledge reservoir which is learning network. Downes (2012) stated that connectivism was propounded by George Siemens in 2004 to describe learning that takes place in a rapidly influenced social digital world. Wong and Oldham (2014) described connectivism as a learning method that organizes information formed in the internet and that the same structure of learning creates neural connections which are found in how individual link ideas and connect to people and information reservoir.

In this study,connectivism is a learning theory that posited that knowledge exists in the world based on the amount of connections an individual established and the number of contacts a learner may have with an object, documents, internet or any other knowledge reservoir. Connectivism is a learning theory based on the premise that knowledge exists in the world rather than in someone's brain. Siemens in Hosea and Tunga (2018) pointed out that, when connectivism is properly implemented, it has the potential to significantly improve learning behaviour through revision of educational perspectives and generate a greater shift toward learner-centred education. Connectivism allows for teacher to step back from controlling course content, bypass textbooks and traditional lecture presentations and bring learners to the forefront in locating, presenting and making sense of relevant knowledge.

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When knowledge is no longer instructors-centred, content and interactions are continuous, learning can occur for all classroom participants, including the instructor. Siemens in Hosea and Tunga (2018) agreed that existing learning theories do not give room for the changing nature of learning due to the influence of technological advances. The author, further described learning as untidy, disorganized, social, collaborative, and connected with other activities and interests. Siemens outlines the following as connectivist principles:

* Learning and knowledge rests in different of opinions.
* Learning is a process of connecting to information reservoirs.
* Learning may not reside only in human being.
* Learning is faultier than knowing.
* Maintaining and nurturing connections is needed to facilitate continual learning.
* Perceiving connections between fields, ideas and concepts is a core skill.
* Currency (accurate, up-to-date knowledge) is the intent of learning activities.
* Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

Connectivism also addresses the challenges that most of the educational institutions faces in knowledge creation. Knowledge that settles in the internet needs to be connected by the right people who need it and in the right place in order to be referred as learning.

Bessenyei, (2007) posited that Learning within connectivism is considered to be a process in which, the role of informal information exchange, organized into networks and supported with electronic tools, becomes more and more significant. Learning becomes a continuous, lifelong system of network activities, embedded into other activities. Bessenyei further stated that the motivation for gaining and contextualizing information becomes stronger if searching and evaluation become a cooperative, network activity. Thus, the collective knowledge once again becomes a source of individual knowledge. As the number of cooperative activities increases, personal social networks become the scene of informal exchange of expertise, and communities of practice develop. Besides the questions of “how” and “what” to learn, now is the question of “where to learn”. Instead of institutions and publishers holding the keys to knowledge, learners can become active participants in the creation of knowledge. At the heart of the matter is that of networks. Essentially, each person provides others with varying learning experiences and the community as a whole becomes the curriculum and the classroom.

To Siemens, in Hosea (2015), what one learns today may be irrelevant and useless tomorrow. There are very few things that change more rapidly than technology. One of the most persuasive factors is the shrinking half-life of knowledge. The half-life of knowledge is the time span from when knowledge is gained to when it becomes obsolete. Half of what is known today was not known in some previous years. The amount of knowledge in the world has doubled in the past decade and is multiply every 18 months according to the American Society of Training and Documentation (ASTD). To fight the shrinking half-life of knowledge, organizations were forced to develop new methods of instructional delivery.Connectivism places emphasis on the importance of instructing students to search for, filter, analyse and synthesize information in order to obtain knowledge. Siemens (2008) stated that the explosion of information available on the Internet, the pace of technological, organizational, and professional change, and the vast number of online connections that can be made between individuals and groups via social media (including colleagues, friends, organizations, corporations, associations, institutions, professional communities, informal communities, etc.), have fundamentally altered the nature of how people think about knowledge. In the past, the knowledge required for professional competence changed little over the lifespan of one’s career. A doctor or engineer could develop their skills at university, and continue to apply those same principles until they retired. Today, the pace of change is so rapid that continued competence requires ongoing learning (unlearning), and the exposure to vast amounts of knowledge over a lifetime. In fact, the amount of knowledge required can no longer be contained within the mind of a single individual, and instead, according to connectivism, is now better stored and processed through technology. Knowledge today exists in web sites, databases, video archives, and thousands of other information repositories, both public (on the internet) and private (within organizational intranets). Smaller amounts of knowledge are also stored within the minds of different people. One’s knowledge may differs from another, but if they are connected to one another and able to interact, that knowledge can be shared. This sharing can take place through face-to-face interactions, but is also possible through online tools such as Twitter, Skype, Facebook, LinkedIn, Google+, WhatsApp, Viber, drop box and many more. As a result, vast amounts of knowledge are available to anyone with access to the network, the ability to navigate it effectively, and possessing a wide range of connections to knowledgeable people. Siemens further asserts that when knowledge is needed, but not known, the ability to plug into sources to meet the requirements becomes a vital skill. As knowledge continues to grow and evolve, access to what is needed is more important than what the learner currently possesses.Siemens compared the flow of information in a knowledge economy to the equivalent of the oil pipe in an industrial economy. Creating, preserving, and utilizing information flow should be a key organizational activity. The pipe is more important than the content within the pipe. Our ability to learn what we need for tomorrow is more important than what we know today (Siemens, 2004).

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To Kefala (2010), knowledge economy can be referred as an organization such as educational institution where people acquire, create, disseminate, and use knowledge more effectively for greater economic and social development. Increased importance of knowledge provides great potential for countries to strengthen their economic and social development by providing more efficient ways of producing goods and services and delivering them more effectively and at lower costs to a greater number of people.

Social network analysis is an additional element in understanding learning models in a digital era. Kleiner (2002) explores Karen Stephenson’s quantum theory of trust which “explains not just how to recognize the collective cognitive capability of an organization, but how to cultivate and increase it”. Within social networks, hubs are well-connected people who are able to foster and maintain knowledge flow. Their interdependence results in effective knowledge flow, enabling the personal understanding of the state of activities organizationally. The starting point of connectivism is the individual. Personal knowledge is comprised of a network, which feeds into organizations and institutions, which in turn feed back into the network, and then continue to provide learning to individual. This cycle of knowledge development (personal to network to organization) allows learners to remain current in their field through the connections they have formed.

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Landauer and Dumais in Hosea (2015) stated that people have much more knowledge than appears to be present in the information to which they have been open to view. They give a connectivist believe that some domains of knowledge contain a very great number of weak interrelations that, if rightly exploited, can greatly increase learning by a process of evidence and reasoning. The value of pattern recognition and connecting small worlds of knowledge are apparent in the exponential impact provided to personal learning. Brown (2002) presents an interesting notion that the internet leverages the small efforts of many with the large efforts of few. The central premise is that connections created with unusual nodes supports and intensifies existing large effort activities. To Brown, the amplification of learning, knowledge and understanding through the extension of a personal network is the epitome of connectivism.

When looking at the history of e-learning it becomes clear that there was a need to develop a new learning theory that would encompass the type of learning that takes place online. In the late 1990’s the Internet was evolving and content was shifting from the controlled distribution of information to include end-user generated materials (student-generated content). As the barriers to developing network content continued to fall, end-users found they were able to create, collaborate and share with relative ease (Siemens, 2007). As a result, this information revolution had significant impact on traditional education as educators, no longer tied to textbooks, were able to offer students collaborative, online learning opportunities. The emergence of personal Websites and Web 2.0 tools such as blogs, wikis, mashups and podcasts, provided a global medium for discussion and the presentation of varying points of view. The Edu blog movement gained significant ground in the early 2000’s and created a community for educators interested in utilizing evolving technologies. Edu blogs provided a forum for reflections on pedagogical methodology, practical applications and best practices. In general, online community members started to learn from each other rather than depend on official, published works. This distributed learning resulted in the co-formation of understanding and learning became a network creation process (Siemens, 2007).

Connectivism can be referred to as networked learning. To explore this description, a closer look at networks is required. Networks are inherently simple; at the minimum they require two elements, nodes and connections. Nodes are elements that can be connected to other elements and connections are the links between nodes allowing for the flow of information. The stronger the connection between nodes, the faster information can travel. Siemens (2005) opined that nodes can take any shape or form including, thoughts, feelings, interactions with others new data and information. Collections of nodes create networks and networks can combine to form even larger networks, in fact, each node in a larger network can be a network of nodes itself.

A community, for instance is a rich learning network of individuals who in themselves are completed learning networks. As individuals become members of network communities, and contribute to the community, the whole network benefits from it and the network grows in intelligence. Downes (2008) stated that the connections between nodes in an individual’s personal learning network could differ in strength. Strength depends upon several factors including an individual’s motivation, exposure, emotions and experience. Individuals with specific learning objectives will be more motivated to make new connections based on the objectives. Exposure relates to repetition as a means to strengthen a connection. The more popular a node, the more other nodes link to it. How individuals feel about nodes (emotions) plays a part in the value placed on the nodes and how differing perspectives are interpreted. An individual’s personal experience helps to define the creation of a network. The creation of networks allows individuals to stay current despite the rapid pace of knowledge development. Again, the ability to learn becomes more important than what is being learned as content is quick to change. The aim of networked learning is to facilitate the development of deep understanding of male and female in complex, worldviews and the ability to quickly assimilate and adapt to shifts in the knowledge base among individuals or gender.

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Gender literarily means the fact of being male or female. According to Bijami, Kashef, and Khaksari, (2013), gender refers to only behavioral, social, and psychological characteristics of men and women.

Therefore, when people are talking about sex and gender they think of sex as biological and gender as a social characteristic of human being (Eckert & McConell-Ginet, 2003). Gender refers to all the culturally determined characteristics and the expected behaviour and roles of men and women which a particular society has determined and assigned to each sex.

The study of gender success in learning process has been an area of focus by researchers. There are separate views on which gender perform better than the other. Some claim that the male child performs better while others are of the opinion that the female children are better (Offorma, 2005). The different opinions on which gender perform better than the other necessitates further investigation on ability as regards to gender. Several studies conducted on gender differences in ability like, Nemeth and Hoffmann (2006), have shown measurable differences in ability of boys and girls. Generally, most of the studies found that boys have better ability than girls. However, Branoff (1998) pointed out that females could benefit as well as males from training programmes. Besides, research findings by Kaufmann, Steinbugl, Dunser and Gluck (2005), indicated that ability can be improved in both male and female students.

Therefore, this study defined gender as a biological, sociological and cultural differences between a male/female student either in cognitive, affective and psychomotor skills acquired in a particular school subject within the same condition and learning environment which ability could be improve when apply the needed learning strategy. It is essential that teachers should use teaching method that would ensure students’ active involvement in learning and provide suitable learning environment to improve academic success of both male and female students who are of different age group/generation.

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**Purpose of the Study**

The purpose of the study was to compare the mean score performance of students in connectivism and traditional classes in Colleges of Education in Adamawa and Taraba State, Nigeria. Specifically, this study sought to determine:

1. The mean score performance of students’ test in a connectivist class and a test in traditional class.
2. The effects of gender on the mean score performance of students’ test in connectivist class and a test in traditional class.

**Hypothesis**

The null hypothesis that guided this study was tested at 0.05 level of significance.

Ho1: There is no significant difference in the mean score performance of male and female students’ test in connectivist class and a test in a traditional class.

**Methodology**

The study adopted quasi–experimental design. The study was carried out in Federal College of Education Yola, Adamawa State and College of Education Zing, Taraba State, Nigeria. The population for the study was 265 NCE III students and it consisted of 101 male students and 164 female students in Federal College of Education Yola, Adamawa State and College of Education Zing, Taraba State, Nigeria.

There was no sampling for this study because all Colleges of Education offering Business Education in the study area (Adamawa and Taraba State, Nigeria) was used.However, a class from each of the two Colleges of Education were purposively assign as control and experimental group by the researcher. Business Communication Achievement Test (BCAT) was used to collect data for the study. The test items were developed using the course content provided by National Commission for Colleges of Education (NCCE) Nigeria Certificate in Education (NCE) Minimum Standards for Vocational and Technical Education 2012 edition.

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The instruments for data collection, which is Business Communication Achievement Test (BCAT) were validated by three experts in Department of Business Education, University of Nigeria, Nsukka, Enugu State. The validates were provided with the purpose of the study, the research questions, Delivery Package for Business Communication (DPBC), Business Communication Achievement Test (BCAT) and Test Blue Print for Business Communication Achievement Test (BCAT) Construction (Table of Specification for BCAT). Validates were requested to verify whether the items were relevant to the study, clearly and appropriately stated and capable of eliciting the right responses from the respondents, appropriateness of language level of the items and choice of appropriate alternatives for the multiple-choice questions. Based on their comments and inputs, the items on the instruments were appropriately modified to make the instruments more valid. Content validation of BCAT was done using the table of specification drawn from the content taught.

Kuder-Richardson formula 20 (K-R20) was used to determine the internal consistency of the instrument. To ensure the reliability of the instrument, thirty students of Business Education Department offering Business Communication in Federal College of Education (Technical) Gombe, Gombe State were experimented in a trial study because the College is not within the study area and they have common characteristics with those respondents in the study area. The Kuder-Richardson formula 20 (K-R20), according to Louis, Manion and Morrison (2007), Nworgu (2006), all concur that when test items are scored “a” or “b” (e.g. wright or wrong) or an untimed test assumed to measure one characteristic or quality, Kuder-Richardson formula 20 should be used. Therefore, Kuder-Richardson formula 20 is suitable for multiple choice questions. The choice of Kuder-Richardson formula 20 (K-R20) assumed that all items in the scale have no equal difficult levels (i.e. no equal proportion of success on the items). Therefore, was considered to be a better reliability estimate. This method was adopted because it ascertains the internal consistency of the instruments. The reliability coefficient for Business Communication Achievement Test (BCAT) was calculated and the result obtained was 952

The instrument for data collection was administered to the respondents by two research assistants who were teachers of Business Communication in the two Colleges of Education. The research assistants were properly guided on how they administered the instruments (BCAT) on the respondents. The research assistants were briefed on matters relating to how students should respond to the instrument, need to be polite to the students, and need to be patient while administering and waiting to collect the instrument, or fix a date to re-administer the instrument as the case may be. Pre-test was administered to all the students in the two institutions, before the treatment of the experiment. The pre-test was used to determine the students’ initial equivalence. At the end of the treatment session, post-test was administered to the students of the study area. Data collected from the two Colleges was recorded and used for analysis based on the demands of the research questions and hypotheses.

The scores obtained were analyzed using mean and mean gain was computed. Also, the null hypothesis Ho1 formulated for the study was tested at 0.05 level of significance using t-test.

**Result of the Study**

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The presentation, analysis and interpretation were organized based on the research questions and hypothesis.

**Research Question 1**

What are the mean score of students’ test in connectivism and a test in traditional class?

The data to this research question is presented in Table 1.

**Table 1:** Mean score performance of students’ test in connectivist and traditional class

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Group** | **N** | **Pre-test** | **Post-test** | **Mean Gain** |
| Traditional Class | 126 | 24.24 | 62.20 | 37.96 |
| Connectivism Class | 139 | 24.30 | 78.24 | 53.94 |

The data presented in Table 1 shows that the traditional classroom has mean score of 24.24 in the pre-test and a mean score of 62.20 in the post-test, making a pre-test, post-test mean gain of traditional class to be 37.96. The connectivism classroom has mean score of 24.30 in the pre-test and a post-test mean score of 78.24 with a pre-test, post-test mean gain of 53.94. From this result, the students in the connectivism classroom performed better in the test than the students in the traditional classroom.

**Research Question 2**

What are the effects of gender on mean score of students’ test in connectivism class and a test in traditional class?

The data to this research question was presented in Table 2.

**Table 2:**Mean score of male and female students’ test in connectivism and a test in traditional class

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group** | **N** | **Gender** | **Pre-test** | **Post-test** | **Mean Gain** |
| Traditional Class | 84 | Female | 23.21 | 57.70 | 34.49 |
|  | 42 | Male | 26.29 | 71.19 | 44.90 |
| Connectivism Class | 59 | Female | 23.90 | 75.68 | 51.78 |
|  | 80 | Male | 24.85 | 81.73 | 56.88 |

The data presented in Table 2 revealed that female students tin the traditional classroom has a mean score of 23.21 in the pre-test and a mean score of 57.70 in the post-test, making the pre-test, post-test mean gain in the female students in the traditional class to be 34.49. Meanwhile, male students in connectivism classroom has a mean score of 26.29 in the pre-test and a post-test mean score of 71.19 with a pre-test, post-test mean gain of 44.90. The table showed that in the connectivism classroom, female students had a mean score of 23.90 in the pre-test and a mean score of 75.68 in the post-test making the pre-test, post-test mean gain of 51.78. Meanwhile, male students in the connectivism classroom had a mean score of 24.85 in the pre-test and a post-test mean score of 81.73 given a pre-test, post-test mean gain of 56.88. With this result, male students in the connectivism classroom scored higher than the female students.

**Testing of Null Hypotheses**

**Ho1:**There is no significant difference in the mean score of male and female students’ in connectivism classroom and those in the traditional classroom.

**Table 3:** t-test comparing mean score of male and female students in connectivism classroom and traditional classroom

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatment | Gender |  | Std. | t-value | P-value | Remarks |
| Connectivism | Male | 81.73 | 9.078 | 4.20 | .011 | Significant |
| Female | 75.68 | 7.40 |

Table 3 indicated the t-test result of male and female students in connectivism class. From the table, the p-value is .011 less than 0.05 level of significance. The null hypothesis was rejected, that there is a significant difference in the mean score of male and female students in in connectivism classroom.

**Findings of the Study**

These findings emerged from the study based on the collected data that was analysed and hypothesis tested.

1. It was discovered that connectivism is more effective than traditional method in improving students’ scores.
2. It was revealed that there is an effect of gender on the scores of male and female students taught in connectivism classroom and it was in favour of the male students.
3. It was found that a significant difference exists in the scores of male and female students taught in connectivism classroom. The male students scored more in the test.

**Discussion of Findings**

1. **Mean score of students taught Business Communication using connectivism:** The data in Table 1 provided answer to research question one. Findings revealed that the connectivism classroom scored more than the traditional classroom. Students taught in the connectivist classroom score higher than students taught in the traditional classroom. This agrees with the findings of Kropf (2013) that information technology, collaborative learning environment, the internet and the various reservoir and social networking provided by the advancement technology improves students learning outcome. Carrillo, Onofa, and Ponce (2010), Barrow, Markman, and Rouse (2009) and Banerjee, Cole, Duflo, and Linden (2007) also affirm that the provision of technology for educational purposes can increase students’ performances in at least two ways. First, the use of technology in the classroom would shift the level of educational inputs and could thus affect students’ learning outcomes. Second, the use of ICT in learning may increase the cognitive abilities of students and this would allow them to learn faster.

Computer-aided learning may be more relevant in a context in which instructor quality is poor, which is the case in the less advanced countries. Although Delen and Bulut (2011) do not agree that the use of technology in teaching/learning as used in the connectivist classroom can predict students’ score. Kim and Chang (2010) agreed that the use of technology in learning reduced the gap in students’ performances. However, Delen and Bulut (2011) accepted that technology is an important factor that should be taken into cognizant when designing classroom instructions.

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1. **Effects of gender on mean score of students in connectivism classroom:** The result presented in Table 2 provides answer to research question two. Male students were found to have performed better than the female students in the connectivism classroom. The findings of this study supported the idea of Ilomäki (2008) who opined that gender differs in their use of technology for learning. Males show better skills in navigating the computers and surfing the internet in seeking for learning resources than the female students. Although Siemens (2004) said that computer technologies is gender neutral, this research work has found that the male students performed more than the female students when computer and internet technologies are used in teaching/learning process.
2. **Significant difference in the mean score of male and female students’ taught Business Communication using connectivism**: The hypothesis tested in Table 3 revealed that there is a significant difference in the score of male and female students in the connectivism classroom. This supported the finding of Sanda and Kurfi (2013), that female students are more prone to technophobia. This psychological disposition makes it difficult for female students to interact with technological tools needed for connectivism and in such affects their scores when compared with the male students. Ilomäki (2008), however, was of the view that technologies needed in the connectivism classroom has become less technical and its communication and creation affordances have become stronger, easier to use, more popular and motivating, all of which has increased female zeal in the use of technology.

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**Conclusion**

The advancement in information technology has revolutionized teaching/learning process thus giving rise to concept like e-learning, virtual learning and online learning etc. Technology based learning is taking over learning process especially in the higher education considering its impact on academic progress and social integration of students. This study therefore, sought to identify the effect of connectivism on students’ learning process precisely in Colleges of Education in Adamawa and Taraba State. The findings of this study concluded that connectivist teaching/learning model is more effective than the traditional method in improving students’ learning outcomes. The higher mean gain recorded in connectivism classroom is given to the fact that the students interacted with one another and experts, the students also make effort and connect to different sources of information resources.

**Recommendations**

Based on the findings of this study, the following recommendations were made:

1. A review of Business Education curriculum should be considered by Nigeria Commission of Colleges of Education (NCCE) with a view of incorporating connectivism in the instructional delivery in colleges of education.
2. Colleges of Education in Nigeria should adopt the use of connectivism in their instructional design.
3. Both Federal and State government through her Ministry of Education should provide ICT facilities and resources adequate enough to fully implement connectivism in schools.
4. Workshops and seminars should be organized by Nigeria Commission of Colleges of Education (NCCE) on how to make effective use of connectivism in their everyday teaching and learning activities.

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**ACCEPTABILITY OF CULTURAL AND SOCIAL COHESIVENESS AS A BEST PRACTICE TOOL IN TVET DELIVERY FOR NATIONAL DEVELOPMENT**

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**Abstract**

*Teaching and learning for adequate service delivery of graduates to the society has created major concern to researchers and government across the world. However, there are reports of low employment rate of graduates in the developing nations, probably because of insufficient skill acquisition though Technical and Vocational Education and Training (TVET) caused by inadequate cultural and social cohesiveness among individuals in TVET programme. This paper presents the assessment of the acceptability of cultural and social cohesiveness as a best practice tool in TVET delivery for national development. A structured questionnaire developed by the researchers in line with the formulated research questions guided the study. Research information was gotten from the questionnaire survey that seeks the opinion of 100 respondents. The respondents were all the teachers of technology and vocational subjects in Ebonyi State. The statistical mean, standard deviation, t-test, correlation and regression analysis were used to analyse the data. The findings revealed that ensuring respect at all levels and making roles clear and explicit are proved ways of minimising management hierarchy to ensure cultural and social cohesiveness in TVET organization for effective TVET delivery. Giving others surprising phone calls and accommodating one another are ways of caring for one another towards cultural and social cohesiveness in TVET organization. Acting immediately to give feedback to any action or reaction observed and asking anonymous quantitative questions are ways of use of feedback approach to guarantee cultural and social cohesiveness in TVET organization for effective TVET delivery. It is recommended that further research be conducted on the development of cultural and social cohesiveness based best practice framework in TVET delivery for national development in Nigeria.*

**Keywords**: TVET delivery, Cultural cohesiveness, Best practice, National development.

**Introduction**

In an offer to change the difficulties of neediness, uncertainty, joblessness, low innovative advance and moderate national improvement caused by lack of care towards TVET, developing cultural and social cohesiveness on TVET personnel (teachers, lecturers, management and coordinators of TVET programmes) for adequate service delivery becomes a welcome idea. Culture is a learned and shared values, beliefs and behaviour common to a particular group of people. Developing a culture in TVET programme entails harmonizing ways of carrying out best practices in TVET programmes. The harmonization of culture in TVET can be achieved through social cohesiveness of TVET personnel in TVET institutions. Social cohesiveness as used in this study is the willingness of TVET personnel to collaborate with each other keeping in mind the end goal to survive and achieve adequate service delivery from TVET programme. Dick (2003) is of the opinion that the readiness to collaborate means to shape associations and have a sensible opportunity of acknowledging objectives, since others will participate and share their abilities to others. Social cohesiveness adds to economic prosperity and TVET is the cornerstone of economic fortune if best practices are applied in its service delivery. The investigation into education for adequate service delivery and the magnitude to which graduates are readily employable has attracted research attention in Malaysia (Zaharim *et al*., 2010), USA (Shivpuri and Kim, 2004), UK (Hillarge and Polland, 1998), Australia (Down, 2012), Indonesia (Setian and Kurnia, 2014), as well as Nigeria. Good TVET delivery to the society could undermine the economic and security instability rampaging the developing nations.

According to Modensela (2017), cultural and social cohesiveness depends critically on the social system that determines people’s behaviour. Therefore, TVET personnel are defined by their cultural values and beliefs in terms of which cohesiveness may meet with best practices in the TVET service delivery. Cultural and social cohesiveness can be formed and changed among individuals in TVET programmes for adequate service delivery.

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As indicated by Badawi (2013), the embraced meaning of TVET by UNESCO and International Labor Organization is a complete term alluding to those parts of the instructional procedure, notwithstanding broad training, the investigation of innovations and related sciences and the obtaining of reasonable abilities, states of mind, comprehension and learning that identifies with occupations in different segments of financial and social life. Maclean (2011) loaned belief to this reality that TVET has the possibilities to enhance aptitudes of students towards a business vantage point. Moreover, Lauglo (2006) commented that TVET improves employability for three classifications of students in the general public. The main class is the students experiencing schooling, without abilities. The second is the individuals who as of now work yet required continues training to sustain their aptitudes. The third class of students is the jobless who need to procure aptitudes for independent work. Likewise, Maclean (2011) affirms that TVET if very much situated could assume multidimensional parts of invigorating financial development, social advancement, enhancing regular instruction, strengthening, riches creation, destitution decrease and aptitude improvement.

The significance of TVET isn't in question in industrialized countries, yet in the unindustrialized countries like Nigeria, it is as yet being seen with a negative observation by guardians and others (Mohammed and Ismial, 2016). NBS (2012) reports that Nigerian graduates have the highest unemployment rate, probably as a result of insufficient skill acquisition through TVET. This might be due to poor cultural and social cohesiveness among individuals in TVET programme.

Although, numerous works have been done on cultural and social cohesiveness, little or no research has been conducted on the development of cultural and social cohesiveness as a best practice strategy for TVET delivery. Therefore, this paper presents the assessment of the acceptability of cultural and social cohesiveness as a best practice tool in TVET delivery for national development.

**Research Objectives**

1. To determine the acceptability of ways of minimising management hierarchy towards cultural and social cohesiveness as a best practice tool for TVET delivery.
2. To determine the acceptability of ways of caring for one another towards cultural and social cohesiveness as a best practice tool for TVET delivery.
3. To determine the acceptability of ways of use of feedback approach towards cultural and social cohesiveness as a best practice tool for TVET delivery.

**Research Questions**

1. How acceptable are the ways of minimising management hierarchy towards cultural and social cohesiveness as a best practice tool for TVET delivery?
2. How acceptable are the ways of caring for one another towards cultural and social cohesiveness as a best practice tool for TVET delivery?
3. How acceptable are the ways of use of feedback approach towards cultural and social cohesiveness as a best practice tool for TVET delivery?

**Hypothesis**

There is no significant difference in the opinion of respondents on the acceptability of cultural and social cohesion as a best practice tool in TVET delivery for national development.

# **Methodology**

The study was carried out in Ebonyi State. The survey research design was used. The population of the study was 426 teachers of technology and vocational subjects in Ebonyi State. The study used a sample of 100 teachers. The instrument used was structured questionnaire developed by the researchers for data collection from the respondents. The instrument has a four points rating scale of highly accepted (HA), accepted (A), rejected (R), and highly rejected (HR). Three experts validated the instrument. The research instrument exhibited a Cronbach’s alpha reliability coefficient of 0.83. 92 copies of answered questionnaire were returned, discovered fit and utilized as a part of the information examination. The statistical mean, standard deviation and t-test were utilized to analyse the data. The decision rule for the mean measurements was 2.5. A mean of 2.5 or more was acknowledged, while a mean underneath 2.5 was rejected. The correlation and regression investigations were conducted to discover the connection between the variables.

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**Results**

*Demographic Analysis of the Respondents*

The investigation of the demography of the respondents presented in Table 1 shows that 80.4 % of the aggregate respondents are males while 19.6 % are females. 58.7 % of the respondents are below 20 years while 41.3 % are above 20 years. 52.2 % of the respondents are university teachers while 47.8 % are teachers from other institutions (polytechnics, college of education, and technical and vocational colleges).

**Table 1:** General characteristics of the respondents

|  |  |  |
| --- | --- | --- |
| Variables Category | | Person (%) |
| General Characteristics gender | male |  |
| female |  |
|
| **total** | **92(100.0)** |
| experience | < 20 y |  |
| > 20 y |  |
|
| **total** | **92(100.0)** |
| Workplace | university |  |
| others |  |
|
| **total** | **92(100)** |

*Research Question 1*

How acceptable are the ways of minimising management hierarchy towards cultural and social cohesiveness as a best practice tool for TVET delivery?

**Table 2:** Mean rating and standard deviations of the respondents on the acceptability of ways of minimising management hierarchy towards cultural and social cohesiveness as a best practice tool for TVET delivery

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Item Statements |  | SD | Remarks |
| 1 | *Acceptability of ways of minimising management hierarchy:*  Ensuring respect at all levels. | 3.79 | 0.97 | Accept |
| 2 | Reducing controls on TVET members. | 3.75 | 1.12 | Accept |
| 3 | Making roles clear and explicit. | 3.76 | 1.31 | Accept |
| 4 | Trusting one another. | 3.65 | 1.29 | Accept |
| 5  6 | Focusing on simple and easily understandable rules.  Optimum distribution of power.  Grand mean | 3.56  3.71  3.70 | 1.25  1.22 | Accept  Accept  Accept |

Table 2 shows the mean and standard deviation of technology and vocational teachers on the acceptability of ways of minimising management hierarchy towards cultural and social cohesiveness as a best practice tool for TVET delivery. All the item statements were accepted, since, all the item have their scores from 2.5 and above.

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*Research Question 2*

How acceptable are the ways of caring for one another towards cultural and social cohesiveness as a best practice tool for TVET delivery?

**Table 3:**Mean rating and standard deviations of the respondents on the acceptability of ways of caring for one another towards cultural and social cohesiveness as a best practice tool for TVET delivery

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Item Statements |  | SD | Remarks |
| 7 | *Acceptability of ways of caring for one another:*  Giving others surprising phone calls. | 3.24 | 1.33 | Accept |
| 8 | Accommodating one another. | 3.26 | 1.12 | Accept |
| 9 | Teaching others the skill you know. | 3.30 | 0.93 | Accept |
| 10 | Inviting others to dinner. | 3.23 | 0.97 | Accept |
| 11  12 | Allowing others to help you.  Running errand for others.  Grand mean | 3.25  2.99  3.21 | 1.24  1.05 | Accept  Accept  Accept |

Table 3 shows the mean and standard deviation of technology and vocational teachers on the acceptability of ways of caring for one another towards cultural and social cohesiveness as a best practice tool for TVET delivery. All the item statements were accepted, since, all the item have their scores from 2.5 and above.

*Research Question 3*

How acceptable are the ways of use of feedback approach towards cultural and social cohesiveness as a best practice tool for TVET delivery?

**Table 4:**Mean rating and standard deviations of the respondents on the acceptability of ways of use of feedback approach towards cultural and social cohesiveness as a best practice tool for TVET delivery

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Item Statements |  | SD | Remarks |
| 13 | *Acceptability of ways of using feedback approach:*  Acting immediately to give feedback to any action or reaction observed. | 3.05 | 0.92 | Accept |
| 14 | Asking anonymous quantitative questions. | 2.93 | 1.12 | Accept |
| 15 | Giving everyone the opportunity to rate TVET performance. | 2.83 | 1.01 | Accept |
| 16 | Asking anonymous qualitative questions. | 2.79 | 1.13 | Accept |
| 17  18 | Using non-defensive tone and body language during feedback exercise.  Giving good information to people to help them succeed in the job.  Grand mean | 2.98  2.72  2.88 | 1.41  1.36 | Accept  Accept  Accept |

Table 4 shows the mean and standard deviation of technology and vocational teachers on the acceptability of ways of use of feedback approach towards cultural and social cohesiveness as a best practice tool for TVET delivery. All the item statements were accepted, since, they have their scores from 2.5 and above.

Hypothesis

There is no significant difference in the opinion of respondents on the acceptability of cultural and social cohesion as a best practice tool in TVET delivery for national development.

**Table 5:**Test analysis between the variables; gender, experience and workplace on the acceptability of cultural and social cohesiveness as a best practice tool in TVET delivery

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Division | | Minimising management hierarchy | Caring for one another | Use of feedback approach |
| Gender | Male |  |  |  |
| Female |  |  |  |
| t-value cal. | 0.25 | -0.17 | 0.45 |
| t-value table | 2.02 | 2.02 | 2.02 |
| Experience | < 20 y |  |  |  |
| > 20 y |  |  |  |
| t-value cal. | 0.17 | 0.64 | 1.28 |
| t-value table | 2.00 | 2.00 | 2.00 |
| Workplace | Uni |  |  |  |
| Others |  |  |  |
| t-value cal. | 0.53 | 0.46 | 0.54 |
| t-value table | 1.98 | 1.98 | 1.98 |

@ 95 % confidence level

Table 5 shows the test analysis between the variables; gender, experience and workplace on the acceptability of cultural and cohesiveness as a best practice tool in TVET delivery for national development. The correlation analysis of the construct of the dependent variables for the acceptability of cultural and social cohesiveness as a best practice tool in TVET delivery for national development is shown in Table 6.

**Table 6:** The correlation between the cultural and social cohesiveness variables as a best practice tool in TVET delivery

|  |  |  |  |
| --- | --- | --- | --- |
|  | Minimizing management hierarchy | Caring for one another | Use of feedback approach |
| Minimizing management hierarchy | 1 |  |  |
| Caring for one another | 0.037258 | 1 |  |
| Use of feedback approach | 0.068456 | 0.584206 | 1 |

Table 7 shows the regression analysis between the general characteristics of the respondent and the dependent variables on the acceptability of cultural and social cohesiveness as a best practice tool in TVET delivery for national development.

**Table 7:** Regression analysis between the variables of cultural and social cohesiveness as a best practice tool in TVET delivery

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Factors | Coefficient | Standard error | t-value | p-value |
| Intercept | 3.654 | 0.051 | 71.699 | 1.1E-178 |
| Gender | 0.346 | 0.139 | 2.480 | 0.013733 |
| Experience | -0.667 | 0.225 | -2.962 | 0.003322 |
| Workplace | 0.389  R  0.193 | 0.187  0.450 | 2.082  F  3.505 | 0.03827  P  0.000 |

**Discussion of Findings**

The findings of the study in Table 2 show that all the item statements are ways of minimising management hierarchy towards cultural and social cohesiveness as a best practice tool for TVET delivery. The findings revealed that ensuring respect at all levels, reducing controls on TVET members, making roles clear and explicit, trusting one another, focusing on simple and easily understandable rules, and optimum distribution of power are proved ways of minimising management hierarchy to ensure cultural and social cohesiveness in TVET organization for effective TVET delivery. The findings of the study in Table 3 show that all the item statements are ways of caring for one another towards cultural and social cohesiveness as a best practice tool for TVET delivery. The findings revealed that giving others surprising phone calls, accommodating one another, teaching others the skill you know, inviting others to dinner, allowing others to help you, and running errand for others are proved ways of caring for one another to ensure cultural and social cohesiveness in TVET organization for effective TVET delivery. The findings of the study in Table 4 show that all the item statements are ways of use of feedback approach towards cultural and social cohesiveness as a best practice tool for TVET delivery. The findings revealed that acting immediately to give feedback to any action or reaction observed, asking anonymous quantitative questions, giving everyone the opportunity to rate TVET performance, asking anonymous qualitative questions, and others are proved ways of use of feedback approach to ensure cultural and social cohesiveness in TVET organization for effective TVET delivery. The findings are in line with the works of Modensela (2017) and Egba *et a*l. (2017) that the development of cultural cohesiveness in an organisation promotes organisational performance.

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The findings of the study in Table 5 show that for the gender factor, the male group has a higher positive inclination for minimising management hierarchy and the use of feedback approach as the elements of cultural and social cohesiveness required for the attainment of best practices in TVET delivery than the female group. For the experience factor, the respondents with<20 years working experience showed higher feelings for minimising management hierarchy, caring for one another, and the use of feedback approach as the elements of cultural and social cohesiveness required for the attainment of best practices in TVET delivery than the respondents with>20 years working experience. Also, for the workplace factor, the respondents that work in the university have a higher inclination for all elements of cultural and social cohesiveness required for the attainment of best practices in TVET delivery than those that work in other institutions such as the polytechnics and colleges of education. The hypothesis that there exists no huge contrast in the assessment of the responders on the acceptability of cultural and social cohesion as a best practice tool in TVET delivery for national development was maintained at 95 % confidence level.

The correlation analysis shown in Table 6 reveal that the more the caring for one another towards cultural and social cohesiveness enables best practice for TVET delivery, the more use of feedback approach does the same, as it has the uppermost connection of 0.584. The connection between minimising management hierarchy and the use of feedback approach is the next with the value of 0.068; followed by the correlation between minimising management hierarchy and care for one another with the value of 0.037. The regression analysis in table 7 indicates that workplace has a higher positive influence on the acceptability of cultural and social cohesion as a best practice tool in TVET delivery for national development than other variable, while experience has a negative influence. The relationship could be explained by the formula in equation 1:

Y = 3.654 + 0.346*G* – 0.667*E* + 0.389*W*  Eq. (1)

Where, *G* is gender, *E* is experience, *W* is workplace, Y = cultural and social cohesiveness acceptability.

The findings support the submission of Modensela (2017) and Egba *et a*l. (2017) who reported that cultural and social cohesiveness is essential for optimal functioning of an organisation.

# **Conclusion**

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The paper discussed the acceptability of cultural and social cohesiveness as a best practice tool in TVET delivery for national development. The study used the survey explore instrument to gather information from 100 respondents on the acceptability of minimising management hierarchy, caring for one another, and the use of feedback approach as elements of cultural and social cohesiveness required for the attainment of best practices in TVET delivery. The questionnaire contains 18 statement items. 92 out of the 100-questionnaire survey were returned, discovered credible and used in the investigation. The response of the respondents was studied based on three major groups, namely: gender, years of experience, and workplace. The statistical mean, standard deviation and t-test were utilized to examine the information. The connection examination was utilized to discover the connection between the variables. The regression analysis was applied to identify the relationship between the independent variables and the dependent variables on the acceptability of cultural and social cohesiveness as a best practice tool in TVET delivery for national development. The following deductions were made, namely:

1. Ensuring respect at all levels, reducing controls on TVET members, making roles clear and explicit, trusting one another, focusing on simple and easily understandable rules, and optimum distribution of power are proved ways of minimising management hierarchy to ensure cultural and social cohesiveness in TVET organization for effective TVET delivery.
2. Giving others surprising phone calls, accommodating one another, teaching others the skill you know, inviting others to dinner, allowing others to help you, and running errand for others are proved ways of caring for one another to guarantee cultural and social cohesiveness in TVET organization for effective TVET delivery.
3. Acting immediately to give feedback to any action or reaction observed, asking anonymous quantitative questions, giving everyone the opportunity to rate TVET performance, asking anonymous qualitative questions, and others are proved ways of use of feedback approach to ensure cultural and social cohesiveness in TVET organization for effective TVET delivery.
4. Minimising management hierarchy variable is the most prominent elements of cultural and social cohesiveness required for the attainment of best practices in TVET delivery.
5. Males have a higher positive inclination for minimising management hierarchy, and the use of feedback approach as the elements of cultural and social cohesiveness required for the attainment of best practices in TVET delivery than the female group.
6. The more the caring for one another towards cultural and social cohesiveness enables best practice for TVET delivery, the more use of feedback approach does the same.
7. There is no significant difference in the opinion of the respondents on the acceptability of cultural and social cohesiveness as a best practice tool in TVET delivery for national development at 95 % confidence level.

It is recommended that further research be conducted on the development of cultural and social cohesiveness based best practice framework in TVET delivery for national development in Nigeria.

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**AGRICULTURAL VALUE CHAIN AND TEACHER PREPARATION FOR EFFECTIVE VOCATIONAL AGRICULTURE DELIVERY IN SECONDARY SCHOOLS**

**BY**

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**Abstract**

*Agriculture occupies a strategic position in the socio-economic development of the nation, and so its study under formal education should be complete, current and functional. As a vocational subject in secondary schools, its teaching should be competency-based such that learners acquire mastery of the learning experiences which make them proficient in agricultural operations. Agricultural innovations have to be promptly introduced into a flexible school curriculum to enable learners imbibe them. Since curriculum is usually reviewed after a long time, innovations in agriculture may not be promptly incorporated into school curriculum. The Agricultural Transformation Agenda of 2013 emphasized value chain in agriculture which gained traction with farmers, but was not immediately incorporated into school agriculture curriculum. The traditional system of education which does not encourage mastery of learning experiences should be replaced with the competency-based system of education. This paper addresses the challenges of incorporating agricultural value chain into the study of agriculture in schools using the competency-based approach.*

**Keywords:** Agricultural innovations, Agricultural transformation, value chain, competency-based teaching and traditional teaching.

**Introduction**

Agriculture is a very important aspect of human existence because it is the process of generating the resources that humans need for survival, development and continuity of the species, especially the supply of food, provision of covering for the body and provision of shelter. Due to the strategic importance of agriculture, it is studied as a very critical discipline under various forms and levels of formal education, from the primary school level, through secondary to the highest levels of tertiary education. Tibi (2012) stated that formal education in agriculture is a planned and recognized set of learning experiences, following developed curricula and largely centered on the pedagogical steps of the teacher who imparts knowledge, attitude and skills of agriculture. Thus a the basic and senior secondary school levels in Nigeria, agriculture is studied as agricultural science, a subject which has been widely criticized for its inability to imbue learners with the necessary knowledge motivations and skills to become proficient and productive in Agriculture.

Present day agriculture emphasizes not only agricultural productivity, but the whole gamut from productivity, through processing, preservation, distribution, marketing and consumption or final utilization of agricultural output. This concept is known as value chain in agriculture.

Agricultural Science as taught in Nigeria secondary schools is not being taught with vocational intent, rather it is being taught merely like a science subject, for the purpose of passing examinations (Tibi, 2011). Agricultural science should comprise of studies in agricultural productivity and the entire agricultural value chain. This is because agricultural value chain has been described as a game changer for both small holder and large scale farmers in Nigeria. Norton (2014) described a value chain as a set of linked activities that work to add value to a product, consisting of actors and actions that improve a product while linking commodity producers to processors and markets. This is needed in the new conception of agriculture curriculum in schools to bring about positive change.

According to Rashtriya (2018), work experience and the vocationalization of general education are indeed central to curriculum reform and development in many countries. This view should guide the review of agricultural science curriculum in schools in Nigeria in order that the study of the subject should emphasize value chain addition.

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Due to the downturn in the economic fortunes of Nigeria occasioned by the plummeting oil prices, low agricultural productivity in the face of enormous natural resources endowment of the country and disdain for farming among our youths, the new thinking and emphasis is on the incorporation of value chain into agriculture. This value chain addition in agriculture needs to be extended into the study of agriculture especially at the basic and secondary school levels as was done in the U.S.A a long time ago. Mkpa (2009) noted that diversified learning imposes on education systems worldwide, the responsibility of being broad of the needs of industries, persons and institutions, preparing bread flexible programmes which are responsive to the demands of an ever-changing world, through life-long learning experiences.

The educational training and preparation that a prospective teacher receives to teach vocational agriculture in schools as well as offer extension services to rural farmers, constitutes agricultural education. Agriculture teachers trained in the old ways are not likely to teach agriculture with the value chain in mind and in approach, so they require a reorientation, either pre-service or in-service on agricultural value chain, before they can effectively inculcate such into their learners. It therefore means that there is the need for innovations in agriculture to be promptly incorporated into the agricultural science curriculum in schools, as soon as they are adopted in agricultural field operations. This is necessary so that learners of agriculture subject in schools can acquire the competencies of such agricultural innovation.

**The Challenge of Injection of Innovations into the Teaching of Agriculture in Schools**

Agricultural development derives essentially from innovations, research output, technological changes and continuous research for ways to respond to challenges that face agriculture daily. Such developments are promptly introduced into agricultural operations as soon as they are confirmed to be practicable, safe, enriching and are not hazardous to crops, animals, man and soils. While these changes are immediately introduced into agricultural operations once they are confirmed to be reliable and supportive of agricultural development, it usually requires a longer time and effort to introduce such changes into agriculture education curricula, at primary, secondary and even tertiary levels of education. In the formal educational systems, curricula are not reviewed annually. It took Nigeria eight years after the National Curriculum Conference of 8th to 12th September, 1986 in Lagos to publish the first volume of the National Policy on Education (N.P.E) in 1977.The current National Commission for Colleges of Education (NCCE) minimum standards took five years to review (NCCE, 2012) and its already over view in 2019.

The implication is that it takes a much longer period for new development that become part of field operations in agriculture incorporated to educational curricula in schools. However, Tibi (2012) stated that the efforts that have been made at various stages of our educational development to improve agricultural productivity and entrepreneurship by way of review of the agricultural curriculum, constitute curriculum diversification.

The purpose of this paper is to present a perspective on the current and trending issues of agricultural value chain and how it can be introduced into the secondary school vocational agriculture study, without waiting for another educational policy review if agricultural development is to benefit from the concept of agricultural value chain in educational institutions.

**Value Chain Addition in School Agriculture for Agricultural Transformation in Nigeria**

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Modern trends in agricultural activities have resulted in new agricultural produce and large scale production as well as changes in consumption patterns of the populace. People are becoming more sophisticated and choosy about what to eat and the quality of produce as a result of globalization. However, constraints such as subsistent small holdings, low mechanization and poor systems of agricultural production based on rudimentary traditional knowledge and practices, makes it difficult for farmers to maximize profit and thus increase their standard of living (Economic Commission for Africa, ECA, 2012). Farmer profitability level can thus be appreciably increased by proper education about value chain addition. The Asian Development Bank, ADB (2013) in its report observed that there are often times no differentiation of farming activities which resultantly shield the benefits that could have accrued from value chain addition. In Nigeria, attention is mostly focused on primary production, huge crop turnover/harvest, large flock management without developing the whole process of agricultural production. This has removed our agriculture from the global market because of lack of competitiveness in Nigeria’s Agricultural products.

Governments all over the world are interested in the potential of value chains to develop agriculture and contribute to food security and this has been on the rise since the year 2008’s global food crisis. Agricultural value chain is a game-charger for both small-holder and large scale farmers in Nigeria because it helps to share risks and responsibilities between different participants in the linkage between primary producers through to final consumers or users.

Today, the largest part of agricultural production in developed and developing countries, does not reach consumers directly from the producers but is marketed via multi-level marketing systems (Bokelman and Adamseged, 2016). Such transactions tend to reduce reward and/or increase risks of producers who have low negotiations skills and capacities. Therefore, most farmers are increasingly integrating into value chains with forwards (marketing) and backward (input supply) linkages (Food and Agriculture Organization, FAO, 2017). Proper education of farmers on the full benefit of value chain addition is therefore imperative for food security in Nigeria. Oseni (2013) stated that transforming Nigeria’s agro-economy requires a shift from Primary produce to manufactured products; traditional technologies to modern technologies and innovations; comparative advantage to competitiveness.Oseni (2013)went further listed the strategies for agricultural transformation as: creating an enabling business environment, developing infrastructure and energy sector; providing financial and service support; providing technical assistance and promoting/facilitating public-private partnership; strengthening innovation systems and commercializing research findings as well as acquiring and adopting new technologies.

Nigeria, through the Agricultural Transformation Agenda (ATA) has currently implemented policies to strengthen the agricultural production process. Thus, agricultural value chain development works on improving the form of coordination between actors and activities along the chain even within the production entities. Conceptually, one can imagine actors linked along a chain producing, transforming and bringing goods and services to end-users through a sequence of activities. In order that agriculture should be taught in schools to achieve the goal of well motivated, knowledgeable and skilled learners, the value chain in agriculture should be introduced into vocational agriculture teaching in schools. Agriculture teachers should acquire the competencies in agricultural value chain subject matter, before they can transmit such experience to their students.

**Teaching Value Chain in Agriculture Using Competency-Based Approach**

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In as much as it is generally recognized that the concept of agricultural value chain is relatively new to agricultural development in Nigeria, it is very important that such an innovation should also be immediately taught to students of agriculture in schools. Learner’s attainment of the goal of effective study of the subject depends on the extent to which the study of vocational agriculture leads to their acquisition of skills and the ability to perform such skills in the field (Tibi, 2012). This is so because amongst the various factors that influence the acquisition of applicable competencies of a subject like agriculture in schools, the teacher’s possession of, and ability to transfer such competencies to the learners, is most crucial. These factors include government agencies, educational policies, school administration, schools, communities, teachers, learners, culture of the people and infrastructure as well as the environment. For a teacher to be effective in teaching agricultural value chain, he or she should first be competent in the subject matter.

It therefore means that there is the need for innovations in agriculture to be properly incorporated into the agricultural science curriculum in schools, as soon as they are adopted in agricultural field operations. This is necessary so that learners of agriculture subject in schools can acquire the competencies of such agricultural innovations.

Akinseinde (1992) described competencies as the behavioural characteristics of knowledge, skills, attitudes and judgment generally required for successful performance of a task. So, pre-service and in-service teachers of vocational agriculture need to be grounded in the concept of agricultural value chain for them to be effective in the subject matter delivery to their students.

Thus the agricultural value chain subject matter should be introduced into pre-service preparation of teachers in their agricultural education programmes in Colleges of Education and Faculties of Education in Universities, while seminars and workshops should be organized for in-service teachers of the subject during school vacations. These are with a view to updating them with the new practices in agricultural development.

In both cases, the competency based approach to teacher education should be adopted competency-based teacher education has the specific purpose of equipping the teacher trainee with specially described knowledge, skills and attitudes that enable him or her meet performance criteria for classroom teaching and in which the objectives of the subjects are determined on the bases of the competencies perceived necessary for daily living for an occupation. The present curriculum of agricultural science by its nature, prescribes the traditional-system both in teacher preparation and in students’ learning of the subject because once he has been taught within the time allocated for the subject and students take termly examinations, learning is assumed to have taken place.

On the other hand, the competency-based system of study of the subject insist that there should be complete mastery of the subject matter by the learners, before learning should be adjudged as having occurred. According to Kitchen (2016), initial teacher education consists of three crucial elements of theory, practice and reflection. All three elements should be captured in a functional teacher education programme for the competency-based system of agricultural science delivery in schools. Tibi (2012) compared course-based teacher education approaches and competency based teacher education and concluded that agricultural educators (teachers; pre-service or in-service) should be provided with knowledge, skills and attitudes (competencies) required for initial success and advancement in the profession. Sturgis (2017) noted that educators organize learning in a variety of ways that respond to students and are designed to motivate and engage students in the mastery of their own learning. Sturgis (2017) further slated that competency-based structures are also designed to ensure students reach proficiency so that the students and parents are confident that their students are learning what they need to, as they advance towards graduation. (see table 1 below).

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**How Competency-Based Education Differs from the Traditional System of Education**

**Traditional System Competency – based system**

|  |  |
| --- | --- |
| Students advance upon the end of a fixed period of time regardless if they fully learned the concepts and skills | Students continue to receive instructional support until they fully learn the concepts and skills and then advance after demonstrating mastery. This requires additional instruction support, not retention. |
| Learning targets are organized around age-based grade levels and provide key skills/knowledge that may be used later in higher-level courses | Measurable learning targets are transparent to students. Schools ensure students have the opportunity to apply or transfer a learning target to new or transfer a learning target to new contexts. Schools monitor student growth and pace within pathways to master standards and competencies |
| The school and instruction are designed to deliver a single curriculum based on age | Districts and schools are organized with greater flexibility to provide instruction and learning opportunities to meet students where they are and take advantage of anytime, anywhere learning |
| Students may receive targeted supports when their academic or behavioural needs are identified as significantly above or below the norm (ie. SPED, gifted). | Students receive timely, differentiated support based on their learning needs. |
| Assessment is used principally for summative purposes. Assessments are conducted at pre-determined points of time or at end of unit and are administered to all students at the same time and in the same format on the same content | Assessments are embedded throughout a student’s learning cycle, and are used primarily to orient a student along their individual learning pathway, as well as inform next steps. Students have options for providing evidence of learning |
| Learning outcomes emphasize academic skills, memorization and comprehension of content. May or may not be aligned to higher order skills or require demonstrations of how to use skills and knowledge. | Learning outcomes emphasize competencies that include deep understanding of content knowledge demonstrated through application as well as the skills to be lifelong learners. |
| Grades reflect a combination of completing assignments, scores on tests and other assessments, and behaviour. Grades are used to create grade point averages to rank and sort students. | Schools know the performance levels of each student and closely monitor growth and progress of students. Scoring is used to communicate with students about their progress in learning. |

*Source: Chris Sturgis (2017): Ne learning models. https://wwww.omnacol.org.*

If the learning experiences in agricultural value chain are acquired in the form of competencies by teachers (either pre-service or in-service), they will become better equipped to transmit such competencies to their students in schools to make such learners become proficient in value chain addition to agricultural practices for the overall development of agriculture in Nigeria.

**Conclusion**

Agriculture study is a discipline that cuts across all the levels of formal education from primary school through secondary, to tertiary levels for the sole purpose of improved productivity and food security. In Nigeria, it is taught as Agricultural Science which has been adjudged not being effectively taught to make effective agriculturists out of the learners. Innovations in agriculture occur daily and are introduced into agricultural operations as soon as they are certified to be safe and enriching to agriculture, but due to the fact that secondary school agriculture curriculum is usually reviewed after an average of over five years, such innovations are not promptly inserted into the schools agricultural curriculum. Agricultural value chain concept which incorporates entrepreneurship and consists of actors and actions from primary production through processing, packaging, marketing, distribution, utilization and or consumption is the trending innovation in world agriculture. There is need to introduce this agricultural value chain concept into school and school administrators should adopt measures to ensure that teachers and their students integrate into these learning experiences.

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**Recommendations**

The following recommendations are hereby suggested for incorporating agricultural value chain into the learning experiences of vocational agricultural students in schools:

1. Schools should go beyond merely emphasizing agricultural production to processing, packaging, distribution and final usage of agricultural outputs.
2. Curriculum developers should model the agricultural curriculum in schools in such a way that as innovations come into the agriculture industry, they are directly integrated into the learning experiences in agricultural studies in schools.
3. Pre-service teachers and especially in-service teachers of agriculture should be properly oriented and/or re-oriented by appropriate authorities on the concept of agricultural value chain through competency-based teacher education, so that they acquire value chain addition competencies which they would transmit to their students.

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**PERFORMANCE IMPROVEMENT NEEDS OF TEACHERS OF AGRICULTURE IN THE CURRICULUM CONTENT OF AGRICULTURAL SCIENCE IN SENIOR SECONDARY SCHOOLS IN GOMBE STATE**

**BY**

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**Abstract**

*The main purpose of this study is to determine the improvement needs of teachers of agriculture in the curriculum content of senior secondary school agricultural science. The study was carried out in Gombe state. The population of the study was 85 agricultural science teachers in the 11 Local Government Areas in the state. There was no sampling; the entire population was involved in the study due to the manageable size of the population. A 4- items questionnaire developed from the curriculum content of senior secondary school agricultural science was employed to collect data for the study. Data collected was analyzed using Need gap analysis. It was found out that teacher of agricultural science in senior secondary schools needs improvement in the following areas of the curriculum content: apiculture, finance and insurance, agricultural stock-exchange and agricultural export-promotion. It was recommended that teachers of agricultural science in senior secondary schools be re-trained in the four areas of the curriculum content.*

**Keywords:**Performance, Improvement, Curriculum and Agricultural Science.

**Introduction**

Agricultural science is one of the subjects taught to student in senior secondary school. Agricultural science according to Iwena (2015) the deliberate effort made by man to till the soil, cultivate crops and rear animals for food and sell to the final consumer. Also Ogieva (2003) defined agricultural science as the preparation of soil for the production of crops and rearing of animals for human use. Agricultural Science is taught in Senior Secondary Schools in Nigeria and Gombe State in particular to achieve the following objective as stated by Nigeria Education Research Development Council (NERDC) (2007):

* Stimulate and sustain student’s interest agriculture
* Enable student to acquire basic knowledge and practical skills in agriculture
* Prepare and exposes student to occupation and opportunities in the felid of Agriculture.

The achievement of these objectives depends to a large intents on the emphasis given to the teaching of the subjects by the teacher. A teacher according to Bakare and Ogunmiladre (2015) is someone whose job is teaching by impacting knowledge to students in a learning environment which result to change of behavior in the student. Miller, Bakare and Ikatule (2010) stated that a teacher is an individual trained in pedagogy and technical area of a particular subject to impart knowledge, skills and attitudes to student in an institution. A teacher of agriculture according to Olaitan, Asogwa and Assouzu (2010) is an individual who is trained in the pedagogical and technical areas of agricultural science and charge with the responsibility of imparting knowledge, skills and attitudes to students. Teachers of agriculture teach the curriculum content of senior secondary schools agricultural science to students.

Curriculum in the view of Emarievbe and Omoraka (2010) is the totality of what happens to a child in the school system. Ibegbu (2010) stated that curriculum is the totality of the experience, which the school offers to student. The author added that these experiences are systemically planned so as to provide positive and desirable behavioural changes in the student and make them fit into the society. Ugwu, Oparaku and Agoha (2015) defined curriculum as the prescribed and planned programme of studies, activities and guidance that are supposed to prepare an individual for meaningful life in society. In this study, curriculum is the prescribed and planned programme in agricultural science that is taught to senior secondary school student to achieve the objectives of agricultural science as stated by NERDC. Presently, the performances of the teachers of agricultural science in the aspect of teaching the curriculum content do not probably predict the hope of achieving the objectives of the subject. Performance according to Wikipedia (2018) is the completion of a task with application of knowledge skills and abilities (attitudes). In this study, performance is how well the teachers of agricultural science in senior secondary schools completed the task of teaching the curriculum content of the subject to their students. It was discovered by the researchers through focus discussion with some of the teachers of agriculture in senior secondary school in Gombe state that new areas of agricultural science such as Apiculture, Insurance and Finance, Agricultural stock exchange and agricultural export-promotion were introduced to the senior secondary school agricultural science curriculum, and these new areas of the curriculum were often left untaught by most of the teachers of agricultural science probably due to their incompetence in these new aspect of the curriculum because they complained that these new areas were not in curriculum when they were trained as teachers. As a result, most of the teachers do avoid this new area of the curriculum and inform their students to read them up on their own. But, the students hardly have the time to read their textbook which often results to the failure of many students in agricultural science in Senior Secondary Schools Certificate Examination (SSCE). The few students that manage to pass external examination graduate without any production skills in agriculture. It is on this back ground the researchers decided to ascertain the performance improvement needs of teachers of agricultural science in the curriculum content of the subject. Improvement according to Dumbiri (2016) is the comprehensive or holistic process of developing a teacher in order to impart knowledge skills and values for education of secondary school students. The secondary school students. Ifeanyieze, Iheji and Ishiwu (2014) described improvement as the performance gap to be filled by lecturers of Agricultural Education in maintenance of equipment for producing graduate that could compete globally for employment. Merriam-Webster (2018) stated that Improvement is the act or process of making the teachers of agricultural Science, in Senior Secondary School perform better in teaching the curriculum content of the subject to their students so that the objective pf teaching the curriculum content of the subject to their students so that the objective of teaching agricultural Science in Senior Secondary Schools in Gombe state will be achieved.

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**Purpose of the Study**

The main purpose of this study is to determine the performance improvement needs teachers of agricultural science in the new areas of curriculum content of agricultural science in senior secondary school. Specifically, the study sought to:

1. Identify the improvement needs of the teachers of agricultural science in apiculture aspect of the curriculum content of the subject.
2. Ascertain the improvement needs of the teachers of the agricultural science in finance and insurance aspect of the curriculum content of the subject.
3. Determine the improvement needs of the teachers of agricultural science in stock exchange aspect of the curriculum content of the subject.
4. Ascertain the improvement needs of the teachers of agricultural science in export –promotion aspect of the curriculum content of the subject.

**Research Question**

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The following sets of questions were formulated to guide the study:

1. What is the improvement need of teachers of agricultural science in apiculture aspect of the curriculum content of the subject?
2. What is the improvement need of teachers of agricultural science in finance and insurance aspect of the curriculum content of the subject?
3. What is the improvement need of teachers of agricultural science in stock-exchange aspect of the curriculum content of the subject?
4. What is the improvement need of teachers of agricultural science in export-promotion aspect of the curriculum content of the subject?

**Hypotheses**

The following hypotheses were formulated and tested at 0.05 level of significance.

1. There is no significance difference in the mean rating of responses of male and female agricultural science teachers on the improvement needs in apiculture aspect of the curriculum.
2. There is no significance difference in the mean rating of the responses of male and female agricultural science teacher on the improvement needs in agricultural stock exchange aspect of the curriculum.

**Methodology**

**Research Design**

This study made use of survey research design. Survey design according Colorado state university (2018) is a type of research design in which the researcher makes a list of questionnaire to extract specific data from a particular group of people. The study adopted survey design because questionnaire was employed to collect data from teachers of agricultural science in senior secondary schools in Gombe state.

**Area of the study**

The study was carried out in Gombe state. The state had 11 Local Government Areas. There are Senior Secondary Schools that offer Agricultural Science in all the Local Government Areas in the state.

**Population of the study**

The population of the study was 85 teachers of agricultural science, in all the secondary schools within the 11 Local Government Areas in the state.

**Sample and Sampling Technique**

There was no sample for study the entire population was involved in the study due to the manageable size of population.

**Instrument for Data Collection**

A 41 items improvement needs questionnaire developed from the content of senior secondary schools agricultural science curriculum was used to collect data for the study. The items in the questionnaire cover the following areas of the curriculum apiculture; insurance and finances; agricultural stock-exchange and agricultural export-promotion which are topics newly introduced into senior secondary schools agricultural science curriculum. The questionnaire had two column as needed and performances. The needed category had 4-points response options of Highly Needed (HN) Averagely Needed (AN) Slightly Needed (SN) and Not Needed (NN) with corresponding values of 4, 3, 2 and 1 respectively. The performance category also had 4. Point response options of High Performance (HP), Average Performance (AP), Low Performance (LP) and No Performance (NP) with corresponding value of 4, 3, 2 and 1 respectively

**Validation of Instrument**

The instrument was face validated by three experts from the Department of Science Education, Federal University, Kashere, Gombe State. The experts were requested to look at the adequacy of the items in line with the research questions, delete any ambiguous statement and add appropriate statements. The suggestion of the validates was used to prepare the final questionnaire items for the study.

**Reliability of the Instrument**

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The reliability of the instrument was determined using Cronbach alpha (α) method, and a reliability coefficient of 0.89 was obtained. The high coefficients indicate that the instrument is very reliable.

**Method of Data Collection**

The researchers hired five research assistants which help in the distribution and the retrieval of the instrument. 70 copies out of 85 copies distributed were retrieved, giving a retrieval rate of 82%.

**Method of date analysis**

The Improvement needs of teachers of agricultural science in senior secondary schools were computed using Need Gap analysis.

Need Gap computation is as follows:

n = Weighted Mean of needed category

p = Weighted Mean of perforce category

1. Where the need gap value is positive (+ve), it means that improvement is needed because the level at which the teacher of agricultural science could perform the item is lower than what is needed.
2. Where the need gap value is negative (-ve), it implies that improvement is not needed because the level at which the teacher of agricultural science could perform the item is higher than what is needed.
3. Where the value of the need gap is zero (0) it means that improvement is not needed because the level at which the teachers of agriculture science could perform the item is equal to the level that it is needed.

**Decision on Hypothesis**

In testing a hypothesis of no significant difference, any item whose P-value is greater than or equal to 0.05 (P was regarded as not significant. While any item whose P-value is less than 0.05(P<0.05) was regarded as significant.

**Results**

The result for the study was obtained from the research questions answered through the data collected and analyzed

**Research question 1**

What are the improvement needs of teacher of agriculture in apiculture aspect of the curriculum content of agricultural science?

Thedata for answering research question 1 are presented in table 1

**Table 1:** Need gap analysis of mean ratings of the response of teachers of agricultural science in the Apiculture aspect of the curriculum content of agricultural science in senior secondary schools.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **Items on Apiculture Aspect of the Curriculum** | **Mean of Needed**  **(**n **)** | **Mean of Performance**  **(**p **)** | **Need Gap Value**  n-p | **Remark** |
| 1 | Meaning of apiculture | 3.36 | 3.36 | 0.00 | INN |
| 2 | Importance of apiculture | 3.23 | 1.20 | 2.03 | IN |
| 3 | Types and life cycle of Bee | 3.25 | 1.01 | 2.24 | IN |
| 4 | Feeding and swamp control methods (queen/stock raising) | 3.35 | 1.25 | 2.10 | IN |
| 5 | Construction of artificial hives | 2.99 | 1.65 | 1.34 | IN |
| 6 | Biology of honey Bee | 3.50 | 2.50 | 1.00 | IN |
| 7 | Honey production and marketing | 3.19 | 1.19 | 2.00 | IN |
| 8 | Hive product and its uses | 3.29 | 1.25 | 2.04 | IN |
| 9 | Bee Pest and diseases | 3.35 | 1.12 | 2.23 | IN |
| 10 | Bee keeping in schools | 3.24 | 1.10 | 2.14 | IN |

Key IN = Improvement needed

**N=70**

INN = Improvement not needed

Table 1 revealed that the need gap values of items 2 to 10 of the curriculum content aspect of agriculture ranged from 1.00 to 2.24 (importance of apiculture to Bee keeping in schools) and were positive. This indicated that teachers of agricultural science in senior secondary schools needed improvement in this curriculum content area of agriculture. Table 1 also revealed that item 1(meaning of apiculture) had a need gap value of 0.00 indicating that teachers of agricultural science in senior secondary school did not need improvement in this item.

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**Research Question 2**

What is the improvement need of teachers of agriculture in finance and insurance aspect of the curriculum content of agricultural science?

The data for answer research question 2 are presented in the table 2.

Table 2: Need Gap analysis of Mean rating of the response of teachers agricultural science in the finance and insurance aspect of the curriculum content of agricultural science in the senior secondary schools. N=70

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S**/N** | **Items on Finance and Insurance**  **Aspect of The curriculum** | **Mean of Needed**  **(**p **)** | **Mean of Performance**  **(**p **)** | **Need Gap Value**  n **-** p | **Remark** |
| 1 | Meaning of agricultural finance and credit | 2.54 | 1. 52 | 1.02 | IN |
| 2 | Source of farm finance and its importance | 2. 73 | 1. 61 | 1. 12 | IN |
| 3 | Agricultural credit and its implications | 3. 27 | 1. 25 | 2. 02 | IN |
| 4 | Effect of taxes and subsidy on agricultural finance | 3. 22 | 1. 21 | 2. 07 | IN |
| 5 | Capital market and capital formation | 3. 11 | 1. 01 | 2. 10 | IN |
| 6 | Agricultural Business |  |  |  |  |
| 7 | Agricultural financial institution | 3. 33 | 2. 12 | 1. 21 | IN |
| 8 | Meaning of agricultural insurance | 3. 19 | 1. 16 | 2. 10 | IN |
| 9 | Importance of agricultural insurance | 3. 29 | 1. 19 | 2. 10 | IN |
| 10 | Agricultural insurance problems | 3. 19 | 1. 29 | 1. 90 | IN |
| 11 | Various agricultural risks | 3. 22 | 1. 10 | 2. 12 | IN |
| 12 | Insurance policy for agricultural production | 3. 26 | 1.14 | 2. 12 | IN |
| 13 | Insurance Premium | 3.41 | 1.20 | 2.21 | IN |
| 14 | Role of public sector in agricultural finance | 2. 54 | 1. 21 | 1. 33 | IN |
| 15 | Measurement of indemnity | 3. 32 | 1. 11 | 2. 21 | IN |

Key IN= improvement needed, INN= improvement not needed

Table 2 revealed that the need gap values of items 1 to 15 of the curriculum content aspect of agricultural finance and insurance ranged from 1.02 to 2.21 and were positive. This indicated that teachers of agricultural science in senior secondary school needed improvement in this curriculum content of agricultural finance and insurance.

**Research Question 3**

What is the improvement need of teachers of agriculture in the stock – exchange aspect of the curriculum content of agricultural science?

The data for answering research question 3 are presented in the table 3.

**Table 3:** Need gap analysis of mean rating of the responses of teachers of agricultural science in agricultural stock – exchange aspect of the curriculum content of agricultural science in senior secondary science schools. N=70

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **Items on Agricultural Stock- exchange Aspect Of The curriculum** | **Mean of Needed (**p **)** | **Mean of Performance**  **(**p **)** | **NeedGap Value**  n **-** p | **Remark** |
| 1. | Meaning of agriculture stock - exchange | 3. 28 | 2. 27 | 1. 01 | IN |
| 2. | Difference between share and stock | 3. 25 | 1. 25 | 2. 200 | IN |
| 3. | People involved in stock – exchange | 3. 28 | 1. 19 | 1. 40 | IN |
| 4. | Importance of stock – exchange in agriculture | 3. 28 | 1. 21 | 2. 07 | IN |
| 5. | Organizational set up in stock exchange | 2. 97 | 1. 55 | 1. 42 | IN |
| 6. | Function of stock – exchange | 3. 13 | 1. 01 | 2. 12 | IN |
| 7.  Key IN= improvement needed, INN= improvement not needed | Terminologies used in stock market | 3.07 | 1. 00 | 2. 07 | IN |

Table 3revealed that the need gap values of items 1 to 7 of the curriculum content aspect of agricultural stock – exchange ranged from 1. 01 to 2. 07 and were positive. This indicated that the teachers of agricultural science in senior secondary school needed

improvement in this curriculum content aspect of agriculture stock – exchange.

**Research Question 4**

What is the improvement need is of teachers of agriculture in agricultural export-promotion aspect of the curriculum content aspect of agricultural science.

The data for answering research question 4 are presented in table 4.

**Table 4:** Need Gap analysis of Mean ratings of the responses of teachers of agricultural science in agricultural export – promotion aspect of the curriculum content of agricultural science In senior secondary schools’

N=70

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **Items on Agricultural Export-Promotion Aspect of The curriculum** | **Mean of Needed**  **(**p **)** | **Mean of Performance**  **(**p **)** | **Need Gap Value**  n **-** p | **Remark** |
| 1. | Meaning and importance marketing | 3.33 | 1.22 | 1.11 | IN |
| 2. | Meaning and Importance of export promotion. | 2.89 | 1.13 | 1.76 | IN |
| 3. | Nigerian agricultural export produce | 3.24 | 1.24 | 2.00 | IN |
| 4. | Stages of agricultural marketing and involvement of government | 3.46 | 1.24 | 2.22 | IN |
| 5. | Export promotion policy and marketing of export crops in Nigeria | 2.99 | 1.63 | 1.36 | IN |
| 6. | Guide lines for exporting crops in Nigeria | 3.10 | 1.52 | 1.58 | IN |
| 7. | Problems of Agricultural marketing and exportation | 3.25 | 2.50 | 0.75 | IN |
| 8. | Meaning and scope of trade | 3.18 | 2.50 | 0.68 | IN |
| 9. | Different between home trade and foreign trade. | 3.55 | 1.33 | 2.22 | IN |

Key IN= improvement needed, INN= improvement not needed

Table 4 revealed that the need gap values of items 1 to 9 of the curriculum content aspect of agricultural export promotion ranged from 0.68 to 2.22 and were positive. This indicated that teachers of agricultural science in senior secondary school needed improvement in this curriculum content aspect of agricultural export promotion.

**Hypothesis 1**

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There is no significant difference in the mean rating of the responses of male and female agricultural science teachers of agriculture on the improvement needs in apiculture aspect of the curriculum. Data for testing hypothesis 1 are presented in the table 5

**Table 5**: t-test analysis on the mean rating of the responses of male and female agricultural science teachers on improvement needs in apiculture aspect of senior secondary agricultural science curriculum.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | N | Mean | SD | Std error | P.value | Remark |
| Male | 50 | 38.71 | 11.53 | 2.38 |  | Not |
| Female | 20 | 17.91 | 4.65 | 1.72 | 0.05 | Significant |

Key 0.05 = No significant P< 0.05 = Significant

Table 5 revealed that the p value of the improvement needs in apiculture aspect of the curriculum is 0.05 and is equal to P = 0.05. This indicated that there was no significant difference in the Mean rating of the responses of male and female teachers of agricultural science in senior secondary school on the improvement need in apiculture aspect of the curriculum content. Therefore the null hypothesis of no significant difference up held.

**Hypothesis 2**

There is no significant difference in the mean rating of the responses of male and female agricultural science teacher on the improvement needs in agricultural stock-exchange aspect of curriculum. Data for testing hypothesis 2 are presented in the table 6.

**Table 6:** t–test analysis on the Mean ratings of the responses of male and female agricultural science teachers on the improvement needs in agricultural stock-exchange aspect of curriculum.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variables | N | Mean | SD | Std error | p-value | Remark |
| Male | 50 | 36.31 | 2.61 | 5.27 |  | Not |
| Female | 20 | 30.37 | 10.66 | 5.33 | 0.12 | Significant |

Table 6 revealed that the P-value of the improvement need in agricultural stock-exchange aspect of the curriculum, is 0.12 and is greater than P= 0.05. This indicated that there was no significant difference in the mean rating of the responses of male and female teachers of agricultural science in senior secondary school on the improvement need in the agricultural stock-exchange aspect of curriculum content. Therefore, the hypothesis of no significant difference up held.

**Discussion of findings**

The study found that teachers of agricultural science in senior secondary schools in Gombe state needed improvement in the following aspects of senior secondary school agricultural science curriculum content areas: 9 items in apiculture, 15 items in finance and insurance of 7 items in agricultural stock-exchange and 9 items in agricultural export-promotion. The findings of this study were in consonance with the findings of Dumbiri (2016) in a study carried out on profession improvement needs of teachers of agricultural science for effective teaching in senior secondary schools in Delta state, where it was found out that 30 pedagogical skills and 13 technical skills were required for professional improvement of the Senior Secondary School teachers in agricultural science. The findings of this study were in agreement with the findings of Bakare and Ogunmilade (2015) in a study carried out on professional competency development needs of basic technology teachers in secondary school in Lagos state where it was found out that teacher of basic technology need professional competency development in:

teaching the content of basic technology curriculum, classroom and laboratory management, using teaching method, instructional materials and media. The findings of this study were also in conformity with the findings of Alaribe, Kelly, Onipede and Olaitan (2014) in a study carried out on capacity building needs of primary school teachers in the management of school farm for effective teaching of agriculture in Enugu state, Nigeria where it was found out that primary school teachers needed capacity building in 11 competency items in planning, 13 competency items in implementing and 8 competency item in evaluating school farm activities.

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**Conclusion**

Some topics were merely introduced into the curriculum content of senior secondary school agricultural science with the aim of achieving the objectives of teaching the subject in the Secondary School. But, it was discovered by the researchers that most of the teachers do not teach the newly introduced topics into the curriculum instead they instruct their student to read the topics up on their own. The attitude of these teachers prompted the researchers to determine the performance improvement needs of teachers of agricultural science in teaching the curriculum content of the subject. It was found out that teacher of agricultural science in senior secondary school needed improvement in apiculture, agricultural finance and insurance, agricultural stock-exchange and agricultural export-promotion aspect of the curriculum.

**Recommendation**

It was recommended that apicture, agricultural finance and insurance, agricultural stock- exchange and agricultural export – promotion aspect of the curriculum content of agricultural science in senior secondary schools be packaged and use for improving the capacity of the teachers through in – service training programme such as seminars conferences and workshops.

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**AVAILABILITY AND ADEQUACY OF EQUIPMENT FOR TEACHING PRACTICAL AGRICULTURE IN FEDERAL COLLEGES OF EDUCATION IN NORTH EAST ZONE OF NIGERIA**

**BY**

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**Abstract**

*This study was carried out to determine the Availability and Adequacy of equipment for teaching practical Agriculture in Federal Colleges of Education in the North East Zone of Nigeria. Survey research design was adopted for the study, two research questions were formulated to guide the study. The population for the study was 1, 038 (480 NCE I and 487 NCE II) agricultural education students and 72 teachers in three Federal Colleges of Education in the North East Zone of Nigeria. A sample size of 363 respondents (72 teachers and 150 NCE 1 students as well as 141 NCE 11 students making the sample size of 291 students) was used for the study. The instrument used for data collection was structured questionnaire which was designed by the researchers, the instrument was subjected to face and content validity by three experts and the reliability of the instrument was established by trial testing, reliability coefficient of 0.81 was obtained using Spearman Brown Step up (Prophecy) formula. Data collected were analyzed using percentage.* *The finding of the study revealed that 54% of the equipment for teaching practical Agriculture in COE are not available while 46% were available. The study also indicates that 77% of equipments for teaching practical Agriculture in COE were not adequate while 23% were adequate. The paper recommended that Agricultural education teachers should intensify effort to ensure availability of practical equipment, so that students can be familiar with many procedures for handling equipment needed for practical Agriculture.. Also Equipments that are not available should be provided, especially in the College farm where practical knowledge and skill of Agriculture is imparted. This is necessary to make Agriculture interesting hence improve the performance of students and skills acquisition.*

**Keywords:** Availability, Equipment, Agriculture, Adequacy

**Introduction**

Agricultural education as a vocational course requires sufficient use of instructional material for effective teaching. Epeju (2001) observed that the basic method of Agricultural education in schools involves highly organized skill development and practice on school farms through demonstrations and project work

Practical skill development can only be achieved if there is enough farm for students Epeju (2001) stated that a school farm should be of big size to be able to accommodate all aspect of Agricultural production and adequately represent the farming in the community in which it is located. It should be for academic purpose with a good scope of livestock and crop enterprises. It should have sufficient and available equipment for its operation.

Availability of equipment may either be adequate, inadequate or they are lacking. Lack of Agricultural equipment prevents schools from developing students to required status. This is supported by United Nation Education Scientific and Cultural Organization (UNESCO, 2001) observed that lack of equipment hindered the expansion of farm which led to specific problems in vocational subjects like Agriculture. This is one reason for the stagnated position of vocational education in Nigeria. This is further emphasized by Omaren (2000) who stated that school farm managers blamed the failure to improve food production on lack of material to meet up viable Agricultural programmes for effective and efficient training in practical skills.

The philosophy of NCE Agricultural education programme is tied to the national philosophy on Agriculture for self-reliance. The objective of the programme according to the National Commission for Colleges of Education (NCCE) (2012); shall be to prepare graduates with the right attitude to knowledge and professional competence in vocational Agriculture among others.

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In order to implement and achieve these objectives of Agricultural education at Colleges of Education, the National Commission for Colleges of Education (NCCE) which is the government regulatory and supervisory agency for the Colleges of Education in Nigeria stipulates the minimum standards of course offering and resource inputs that need to be available for the establishment and administration of Agricultural education programme at that level. The NCCE (2012) classified facilities in Agricultural education based on different aspect of Agriculture. These include Standard school farm made up of the following: mechanical/tools workshop, a livestock unit of selected farm animals, fish pond,, Individual students plot, experimental plot for research, crop farm, facilities for bee keeping, snailery or cane for rat farming and two standard laboratories for crop/soil science and for livestock studies

It is expected that these facilities should be made available in each college. Availability, in the opinion of Ibrahim (2007) refers to the condition of being obtainable or accessible at a particular time. It expresses how a material can easily be gotten and used for a particular purpose and time. It also states how operable or usable resources are upon demand to perform its designated or required functions. In this study, availability means the condition with which Agricultural education teachers have access and make use of functional Agricultural equipment and materials for effective teaching of Agricultural practical. It refers to the quality, quantity and disposability of such instructional materials to Agricultural education teachers at every point in time for effective utilization especially when they are adaquate.

Adequacy of equipment has to do with the provision of enough equipment in relation to the number of students for effective teaching and learning. Availability and adequacy of equipment for teaching Agriculture is of paramount importance for acquisition of practical skills and effective implementation of vocational education programme. Ezuga (2000) emphasized the need for provision of adequate instructional equipment for Vocational, Technical and Science Education, For Agricultural education teacher to transfer the needed skills and knowledge he must be able to effectively handle and manipulate the necessary equipment during practical’s. This implies that Agricultural equipment and materials are to be available and adequate for use at all level of Agricultural education programme for effective utilization

Teaching of practical Agriculture in many schools is associated with many problems, including improper demonstration of necessary skills and knowledge of Agricultural practices to students and this make it difficult to fill the gap of tomorrows farmers, the needed skills cannot be acquired if they are not properly trained and exposed to the operation and manipulation of equipment and materials needed for practical during class teaching, in laboratory and on farm (Yusuf 2012).

Ondia (1995), stated that students do not adequately demonstrate Agricultural skills in schools due to many factors attributed to equipment and other materials. However the availability and adequacy of equipment for teaching practical Agriculture in North East federal colleges have not yet been assessed. This study. Therefore, determined the Availability and Adequacy of Equipment for Teaching Practical Agriculture in Federal Colleges of Education in North East Zone of Nigeria**.** Specifically the study assessed the:

**Purpose of the Study**

The main purpose of this study is to determine the Availability and Adequacy of Equipment for Teaching Practical Agriculture in Colleges of Education in North East Zone of Nigeria, the specific objectives are to determine the

1. availability of equipment for teaching practical Agriculture in Colleges of Education
2. adequacy of equipment for teaching practical Agriculture in Colleges of Education

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**Research Questions**

To achieve the objectives of the study, the following research questions were posed

1. Which equipment are available for teaching practical agriculture in Colleges of Education?
2. How adequate are equipment for teaching practical agriculture in Colleges of Education?

**Methodology**

Survey research design was adopted for the study. Survey research design study a sample taken from a well-defined population (Abdussalami 2005). The area of the study was North East Zone of Nigeria. The target population of this study was made up 480 NCE 1, and 487 NCE 11students and72 teachers all from department of Agricultural Education in the three Federal Colleges of Education in North Eastern Nigeria. The Colleges include FCE (T) Gombe having a total number of 611(566 teachers and 45 students), FCE (T) Potiskum a total number of 280 (265 students and 15 teachers) and FCE Yola with 148 (136 students and 12 teachers), making a population size of 1039 students and teachers for 2017/18 academic session. The reason for the use of NCE 1 and 11 is because it’s at that level students are subjected to real practical activities in respect of AGE 218 and AGE 117.

Purposive and stratified sampling techniques was used to obtained 363 respondent made up of 72 teachers and 291 students. The entire population of teachers was studied while stratified random sampling techniques were used to pick the number of students that participate in the study. The instrument for collecting data was structured questionnaire which was developed by the researcher from the literature reviewed for the study. The questionnaire was 52 equipment as it contained in the new NCCE minimum standard curriculum, and arranged in accordance with the research questions, the questionnaire consist of checklist which allowed the respondents to check the items based on the availability and adequacy of the items at a ratio of one equipment per 15 students (1:15)

The instrument was subjected to content and face validity by three experts. Data collected was analyzed using percentage, decision rule of 50% was used, this means that any equipment with more than 50% score was considered available or adequate and less than 50% was not available or not adequate

**Findings of the study**

**Table 1:** Responses of Teachers and Students on Availability of Equipment for Teaching Practical Agriculture in COE (n=363)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Equipment for Teaching Practical Agriculture** | | | | **(Students Response)** | | | **(Teachers Response)** | | **Remarks** |
|  |  | Av Frq | % | Nav Frq | Av Frq | **%** | Nav Frq | Av Frq | Nav Frq |  |
|  | Water pumping machine | 91 | 31 | 200 | 69 | 12 | 17 | 60 | 83 | NAV |
|  | Seed Sower | 80 | 27 | 211 | 73 | 10 | 14 | 62 | 86 | NAV |
|  | Root pruner | 71 | 24 | 220 | 76 | 15 | 21 | 57 | 79 | NAV |
|  | Plant lifter | 60 | 21 | 231 | 79 | 14 | 19 | 58 | 81 | NAV |
|  | Sprayer | 241 | 83 | 50 | 17 | 50 | 69 | 22 | 31 | AV |
|  | Flame weeder | 51 | 18 | 240 | 82 | 12 | 17 | 60 | 83 | NAV |
|  | Water spraying machine | 72 | 25 | 219 | 75 | 10 | 14 | 62 | 86 | NAV |
|  | Water spraying sprinkler | 70 | 24 | 221 | 76 | 8 | 11 | 64 | 89 | NAV |
|  | Stevenson screen | 80 | 27 | 211 | 73 | 2 | 3 | 70 | 97 | NAV |
|  | Thermo hydrograph | 15 | 5 | 276 | 95 | 1 | 1 | 71 | 99 | NAV |
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|  | Rain gauge | 241 | 83 | 50 | 17 | 50 | 69 | 22 | 31 | AV |
|  | Anemometer | 220 | 76 | 71 | 24 | 48 | 67 | 24 | 33 | AV |
|  | Evaporometer | 248 | 85 | 43 | 15 | 30 | 42 | 42 | 58 | AV |
|  | Barometer | 225 | 77 | 66 | 23 | 51 | 71 | 21 | 29 | AV |
|  | Hygrometer | 236 | 81 | 55 | 19 | 49 | 68 | 23 | 32 | AV |
|  | Prismatic compass | 252 | 87 | 39 | 13 | 52 | 72 | 20 | 28 | AV |
|  | Theodolite | 260 | 89 | 31 | 11 | 60 | 83 | 12 | 17 | AV |
|  | Planimeter | 62 | 21 | 229 | 79 | 14 | 19 | 58 | 81 | NAV |
|  | Stereoscope | 70 | 24 | 221 | 76 | 12 | 17 | 60 | 83 | NAV |
|  | Functional Tractor | 260 | 89 | 31 | 11 | 62 | 86 | 10 | 14 | AV |
|  | Discplough | 258 | 89 | 33 | 11 | 59 | 82 | 13 | 18 | AV |
|  | Disc harrow | 254 | 87 | 37 | 13 | 58 | 82 | 13 | 18 | AV |
|  | Disc ridger | 260 | 89 | 31 | 11 | 50 | 69 | 22 | 31 | AV |
|  | 4 wheeled trailer | 260 | 89 | 31 | 11 | 52 | 72 | 20 | 28 | AV |
|  | Fertilizer sprayer | 86 | 30 | 205 | 70 | 21 | 29 | 51 | 71 | NAV |
|  | Mould board ridger | 20 | 7 | 271 | 93 | 12 | 17 | 60 | 83 | NAV |
|  | Mould board plough | 55 | 19 | 236 | 81 | 10 | 14 | 62 | 86 | NAV |
|  | Tractor pully | 261 | 90 | 30 | 10 | 14 | 19 | 58 | 81 | AV |
|  | Seed cleaner | 74 | 25 | 217 | 75 | 11 | 15 | 61 | 85 | AV |
|  | Seed grader | 48 | 16 | 243 | 84 | 10 | 14 | 62 | 86 | NAV |
|  | Cereal thresher | 80 | 30 | 204 | 70 | 8 | 11 | 64 | 89 | NAV |
|  | Incubator and hatcher | 245 | 84 | 46 | 16 | 60 | 83 | 12 | 17 | AV |
|  | Egg handler | 256 | 88 | 35 | 12 | 69 | 96 | 3 | 4 | AV |
|  | De-beaker | 246 | 85 | 45 | 15 | 60 | 83 | 12 | 17 | AV |
|  | Vaccinator | 203 | 70 | 88 | 30 | 50 | 69 | 22 | 31 | AV |
|  | Weighing scale | 257 | 88 | 34 | 12 | 62 | 86 | 10 | 14 | AV |
|  | Inter row weedier | 51 | 18 | 240 | 82 | 11 | 15 | 61 | 85 | NAV |
|  | Fishing boat | 53 | 18 | 238 | 82 | 12 | 17 | 60 | 83 | NAV |
|  | Sinker | 73 | 25 | 218 | 75 | 7 | 10 | 65 | 90 | NAV |
|  | Gari Making Machine | 63 | 22 | 228 | 78 | 15 | 21 | 57 | 79 | NAV |
|  | Cassava pelleting machine | 43 | 15 | 248 | 85 | 11 | 15 | 61 | 85 | NAV |
|  | Milling machine | 44 | 15 | 247 | 85 | 13 | 18 | 59 | 82 | NAV |
|  | Maize Sheller | 71 | 24 | 220 | 76 | 10 | 14 | 62 | 86 | NAV |
|  | Oil screw press | 51 | 18 | 240 | 82 | 8 | 11 | 64 | 89 | NAV |
|  | Honey extractor | 42 | 14 | 249 | 86 | 6 | 8 | 66 | 92 | NAV |
|  | Surgical kit | 48 | 16 | 243 | 84 | 8 | 11 | 64 | 89 | NAV |
|  | Cattle hoof trimming set | 203 | 70 | 88 | 30 | 60 | 83 | 12 | 17 | AV |
|  | Castrator | 274 | 94 | 17 | 6 | 58 | 81 | 14 | 19 | AV |
|  | Sterilizer | 68 | 23 | 223 | 77 | 10 | 14 | 62 | 86 | NAV |
|  | Candler | 254 | 87 | 37 | 13 | 64 | 89 | 8 |  | AV |
|  | Bee Keeping Equipment | 58 | 20 | 233 | 80 | 7 | 10 | 65 | 90 | NAV |

frq = Frequency AV = Available NAV = Not Available

In Table 1, the study revealed that twenty eight represented as (54%) of the equipment for teaching practical Agriculture in COE were not available, twenty four represented as (46%) were available for teaching practical Agriculture in COE

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**Table 2:** Responses of Teachers and Students on Adequacy of Equipment for Teaching Practical Agriculture in COE at ratio of 1:15 (n=363)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Equipment for Teaching Practical Agriculture** | | | | **(Students Response)** | | | **(Teachers Response)** | | **Remarks** |
|  |  | Av Frq | % | Nav Frq | Av Frq | **%** | Nav Frq | Av Frq | Nav Frq |  |
|  | Water pumping machine | 24 | 8 | 265 | 92 | 15 | 21 | 57 | 79 | NAV |
|  | Seed Sower | 88 | 30 | 203 | 70 | 13 | 18 | 59 | 82 | NAV |
|  | Root pruner | 53 | 18 | 238 | 82 | 10 | 14 | 62 | 86 | NAV |
|  | Plant lifter | 43 | 15 | 248 | 55 | 8 | 11 | 64 | 89 | NAV |
|  | Sprayer | 30 | 10 | 261 | 90 | 12 | 17 | 60 | 83 | AV |
|  | Flame weeder | 47 | 16 | 244 | 84 | 7 | 10 | 65 | 90 | NAV |
|  | Water spraying machine | 90 | 31 | 201 | 69 | 14 | 19 | 58 | 81 | NAV |
|  | Water spraying sprinkler | 83 | 29 | 208 | 71 | 3 | 4 | 69 | 96 | NAV |
|  | Stevenson screen | 64 | 22 | 227 | 78 | 5 | 7 | 67 | 93 | NAV |
|  | Thermo hydrograph | 71 | 24 | 220 | 76 | 10 | 14 | 62 | 86 | NAV |
|  | Max and min thermometer | 205 | 70 | 86 | 30 | 50 | 69 | 22 | 31 | AD |
|  | Rain gauge | 224 | 84 | 46 | 16 | 55 | 76 | 17 | 24 | AV |
|  | Anemometer | 224 | 77 | 67 | 23 | 59 | 82 | 13 | 18 | AV |
|  | Evaporometer | 89 | 31 | 202 | 69 | 22 | 31 | 50 | 69 | NAD |
|  | Barometer | 224 | 77 | 67 | 23 | 62 | 86 | 10 | 14 | AD |
|  | Hygrometer | 278 | 96 | 13 | 4 | 58 | 81 | 14 | 19 | AV |
|  | Prismatic compass | 287 | 99 | 4 | 1 | 59 | 82 | 13 | 18 | AV |
|  | Theodolite | 53 | 19 | 238 | 81 | 12 | 17 | 60 | 83 | NAD |
|  | Planimeter | 83 | 29 | 208 | 71 | 7 | 10 | 65 | 90 | NAD |
|  | Stereoscope | 65 | 22 | 226 | 78 | 5 | 7 | 67 | 93 | NAD |
|  | Functional Tractor | 250 | 86 | 41 | 14 | 50 | 69 | 22 | 31 | AD |
|  | Discplough | 248 | 86 | 43 | 14 | 55 | 76 | 17 | 24 | AD |
|  | Disc harrow | 250 | 86 | 41 | 14 | 60 | 83 | 12 | 17 | AD |
|  | Disc ridger | 257 | 89 | 34 | 11 | 61 | 85 | 11 | 15 | AD |
|  | 4 wheeled trailer | 234 | 80 | 57 | 20 | 51 | 73 | 21 | 29 | AD |
|  | Fertilizer sprayer | 74 | 25 | 217 | 75 | 14 | 19 | 58 | 81 | NAD |
|  | Mould board ridger | 11 | 4 | 280 | 96 | 7 | 10 | 65 | 90 | NAD |
|  | Mould board plough | 15 | 5 | 276 | 95 | 9 | 12 | 63 | 88 | NAD |
|  | Tractor pully | 89 | 31 | 202 | 69 | 5 | 7 | 67 | 93 | NAD |
|  | Seed cleaner | 69 | 84 | 222 | 76 | 6 | 8 | 66 | 92 | NAD |
|  | Seed grader | 43 | 15 | 248 | 85 | 9 | 12 | 63 | 88 | NAD |
|  | Cereal thresher | 27 | 9 | 264 | 91 | 20 | 28 | 52 | 72 | NAD |
|  | Incubator and hatcher | 66 | 22 | 225 | 78 | 12 | 17 | 60 | 83 | NAD |
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|  | De-beaker | 18 | 6 | 273 | 9 | 4 | 12 | 17 | 60 | NAD |
|  | Vaccinator | 27 | 9 | 264 | 91 | 5 | 7 | 67 | 93 | NAD |
|  | Weighing scale | 242 | 83 | 49 | 17 | 50 | 69 | 22 | 31 | AD |
|  | Inter row weedier | 53 | 18 | 238 | 8 | 10 | 14 | 64 | 86 | NAD |
|  | Fishing boat | 39 | 13 | 252 | 87 | 7 | 10 | 65 | 90 | NAD |
|  | Sinker | 73 | 25 | 218 | 75 | 5 | 7 | 67 | 93 | NAD |
|  | Gari Making Machine | 52 | 18 | 239 | 82 | 11 | 15 | 61 | 85 | NAD |
|  | Cassava pelleting machine | 43 | 15 | 248 | 85 | 8 | 11 | 64 | 89 | NAD |
|  | Milling machine | 42 | 14 | 249 | 86 | 4 | 6 | 68 | 94 | NAD |
|  | Maize Sheller | 61 | 21 | 230 | 79 | 8 | 11 | 64 | 89 | NAD |
|  | Oil screw press | 51 | 18 | 240 | 82 | 5 | 7 | 66 | 93 | NAD |
|  | Honey extractor | 40 | 14 | 251 | 86 | 4 | 6 | 68 | 94 | NAD |
|  | Surgical kit | 45 | 15 | 246 | 85 | 4 | 6 | 68 | 94 | NAD |
|  | Cattle hoof trimming set | 7 | 2 | 284 | 98 | 10 | 14 | 62 | 86 | NAD |
|  | Castrator | 57 | 20 | 234 | 80 | 21 | 29 | 51 | 71 | NAD |
|  | Sterilizer | 63 | 22 | 228 | 78 | 12 | 17 | 60 | 83 | NAD |
|  | Candler | 63 | 22 | 228 | 78 | 8 | 11 | 64 | 89 | NAD |
|  | Bee Keeping Equipment | 43 | 15 | 248 | 78 | 3 | 4 | 69 | 96 | NAD |

frq = Frequency AD = Adequate NAD = Not Adequate

Table 2 revealed that forty represented as (77%) of equipments for teaching practical Agriculture in COE were not adequate while twelve represented as (23%) of the equipment for teaching practical Agriculture were adequate.

**Summary of Findings**

The finding of the study revealed that only 46%were available while 23% of the available equipment for teaching practical Agriculture were adequate

**Discussion of Findings**

The first findings that 46% of the equipment for teaching practical Agriculture in COE were available, these include sprayer, minimum and maximum thermometer, rain gauge, anemometer, everporometer, barometer, hygrometer, prismatic compass others include theodolite, functional tractor, disc plough, disc harrow, disc ridger, four wheeled trailer, tractor pully, seed cleaner, incubator, egg handler, de beaker, vaccinator, weighing scale, cattle hoof teaming set, castrator and Candler while 54% of the equipments were not available for teaching practical Agriculture in COE these include water pumping machine, seed sower, root pruner, plant lifter, flame weeder among others as shown in Table 1.This means that the number of equipments that are not available for teaching practical Agriculture as recommended by NCCE exceeded the available ones, which is in line with the findings of Asogwa, Onu, and Egbo (2013) in a study on the availability and utilization of instructional materials for effective teaching of fish production to students in senior secondary school in Benue state, Nigeria. The outcomes of the study revealed that out of all the instructional materials recommended by the National Educational Research and Development Council (NERDC, 2009) for teaching fish production to students, 8 of them were available while 14 of the recommended instructional materials in fish production were not available in schools. The findings of the study on availability were also in conformity with the findings ofYusuf (2012) in a study on the evaluation of Agricultural science laboratory in Government Secondary Schools in Kaduna state where it was found out that mean response of teachers and students on budding knife, weighing scale, shovel, ox drown plough, feed trough were rated not available while cutlass, pins, pegs and tape, cylinder, beaker, tripod stand, funnel, fish rod and net, feed trough, water trough, castirator, Gunter chain, hand fork were rated moderately available. The study by Yusuf also indicated that budding knife, secateurs, cylinder, silos, were not adequate while sickle, cutlass, pin and tape, beaker, tripod stand, funnel, ox drown plough, fishing rod and net were adequate. Also Jinko, Olorunaiye, Nwafulugo and Omengagala (2015) find out that some of the instructional materials required for teaching Agricultural science are not available. There are enough qualified teachers but with inadequate equipment

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Regarding the adequacy of equipment for teaching practical Agriculture the findings revealed that 77% of equipment for teaching practical Agriculture in COE were not adequate these include bee keeping equipment, candler, sterilizer, castrator, cattle hoof trimming set among others in Table 2, while 23% of the equipment for teaching practical Agriculture were adequate these include weighing scale, 4 wheel trailer, disc ridger, disc harrow, disc plough, functional tractor, prismatic compass, hygrometer, barometer, anemometer, rain gauge and minimum and maximum thermometer. This means many of the equipments which were recommended by NCCE for teaching practical Agriculture were not adequate, this is in line with findings of Moses and Chimezie (2013) who conducted a study on the Assessment of the Adequacy of Instructional Resources in Business Education Programmes: Relative to NCCE standard for Colleges of Education in Nigeria. The result reveals that Instructional resources (both human and material) are inadequate in the Colleges of Education in Edo and Delta States of Nigeria. On the basis of these therefore, it could be concluded that students of Agricultural Education in these Colleges of education in this study are learning without the necessary and required resources and facilities for teaching and learning, and this may have affected the preparation and performance of the students over the years. And of course, these Colleges are operating below the NCCE prescribed regulated standards.

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Therefore instructional equipment for teaching Agricultural practical must be adequately available in order to enhance student’s performance as stated by Nsa, Ikot and Udo (2013) that students taught practical Agriculture using instructional charts, pictures and filmstrips performed significantly better than students taught without instructional materials. In the process of teaching/learning, instructional equipment that were used facilitated students understanding by supplementing, clarifying, revitalizing and emphasizing the teacher’s verbal efforts. This assertion agree with what Yusuf (2012) said the adequacy of teaching equipment in Agricultural science laboratory in schools may generate good performance and this depend on adequacy of fund made available to schools.

**Conclusion**

Conclusively, only 46% of the equipments for teaching practical Agriculture in Federal Colleges of Education within the north east zone of Nigeria are available and within the available ones only 23% are adequate at a ratio of 1:15 per students practical

**Recommendations**

Based on the findings of the study the following recommendations were made:

1. Agricultural education teachers should intensify effort to ensure availability of practical equipment, so that students can be familiar with many procedures for handling equipment needed for practical Agriculture.
2. Equipments that are not available should be provided by the government, especially in the College farm where practical knowledge and skill of Agriculture is imparted. This is necessary to make Agriculture interesting hence improve the performance of students and skills acquisition.

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**ACCEPTABILITY OF IMPROVED SWEET POTATO VARIETY PRODUCED WITH INNOVATIVE AGRONOMIC PRACTICES FOR ADOPTION BY FARMERS IN BENUE STATE.**

**BY**

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**Abstract**

*On-farm trial on sweet potato production was carried out in 2015 cropping season in four local government areas (L.G.A.s) of Benue State aimed at introducing an improved high yielding sweet potato variety and Good Agronomic Practices (GAP) to the farmers for acceptance and adoption. The experiment consisted of a 2x2 split- plot in randomize complete block design replicated four times. The main plot is variety (introduced variety- NRSP/05/007C and indigenous variety used in the area), sub plot is plant population (recommended population of 33,333 plants/ha and farmers practice- below 25,000 plants/ha). Result showed that introduced variety NRSP/05/007C yielded higher (14.23t/ha) with a net return of ₦ 91,480.00/ha over indigenous varieties. Also, recommended plant population yielded higher (13.89t/ha) than farmers practice (10.15t/ha) of less than 25,000 plants/ha. Farmers ranked plant population of 33.333 plants/ha as better and accepted that replacement of indigenous varieties with introduce variety is economically attractive. From the result obtained in this trial, it is recommended that more extension work needed to be carried out to enlighten the farmers on need for improved high yielding sweet potato varieties and optimal plant population for optimization of yield and economic benefit.*

**Keywords**: Introduced variety, acceptability, innovative agronomic practice, economic benefit.

**Introduction**

The objective of applied agricultural research is to identify new farming practices and materials that will improve the farmer’s production system and increase their productivity and well being in a way that can be sustained. Traditionally, research was mainly conducted on- station with the hope that the results would be taken by the extension service for dissemination to the farmers. This approach in most cases, led to the development of technologies, which were too broad in application. There was lack of specificity in terms of the biophysical and socio economic circumstances of the beneficiaries of the technologies. This top down approach resulted in low adoption of technologies and hence lack of impact (Murithi, 2001). The failure of this model in many developing countries has caused agricultural scientists to adopt On-Farm Research (OFR) as necessary tool in the development and transfer of appropriate technology (Mutsaers *et al.,* (1997 in Abrol, 2013 and Azunah, 2018).

Edje (1990) in Rempel (2012), defined on-farm research as an independent tool for developing and validating farming technology on the farmers land, whereas Attah-krah and Francis (1987) in Thompson (2016) see it as research carried out on farmers field, involving the farmer and in the farmers environment which signify that the elements of on-farm research include the farmer, the farmers land, the farmers involvement, and the farmers environment.

Sweet potato is one of the world most important food crops due to its yield and nutritive value (Raemacker, 2001 and used by Spore, 2013). Globally, sweet potato is the seventh most important food crop and second most important tuber/root crop in the world after Irish potato ( Dantata *et al.,* 2010). Tewe *et al* (2003) in Egbe *et al.,* (2012) reported that Nigeria is the third largest producer of sweet potato (2.516 million metric tons) with China leading (106.197 million metric tons). Sweet potato has become an attractive crop among farmers due to its high productivity, universal uses, calorie content and good taste (Antibong *et al*., 2008). It tolerates adverse environmental conditions such as drought, low soil fertility and it require very little labor and care compared to other crops (Abdissa, 2011). The crop grows with temperatures between 15°C and 35°C; hence it is planted and harvested almost every month in one part or the other in the world (Nedunhezhiyan and Ray, 2010). It is one of the cheapest potential sources of vitamin A to alleviate problems of night blindness and infant mortality (Korieocha *et al.,* 2009). Researchers revealed sweet potato as a weapon against diabetes as a result of its low glycemic index (Zakir *et al., 2008* and Bradley, 2009)

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In Nigeria, the crop has ceased to be a ‘backyard’ crop to a major food and industrial root crop. Cultivating sweet potato in farmers plot would not only ensure better environmental resource utilization but would also provide better yield sustainability and diversified rural income (Egbe and Idoko, 2009)

**Statement of problem**

The yield of sweet potato is said to be up to 50t/ha in on – station trials but at on – farm with improved varieties and management practices, 17 – 45t/ha could be achieved depending on the environment (Workayehu *et al*., 2011). The production efficiency of a plant is determined by the variety, the environment and the agronomic practices used. Among the agronomic factors, plant population, which affects growth rate, efficiency of solar energy utilization and conversion, seems to determine the biomass accumulation.

A survey by BNARDA (2007) showed that sweet potato cultivars commonly cultivated by farmers in Benue State, Nigeria often result in low yield (3-9 t/ha*).* Problems associated with production and productivity of sweet potato in Nigeria have been enumerated by Udealor *et al.*( 2006) and used by Yahaya *et al.,*(2015) to include lack of appropriate agronomic practices, pest and disease problems and usage of low yielding cultivars, amongst others.

**Purpose of study**

The main purpose of this study is to introduce a high yielding improved variety and recommended plant population of sweet potato and access the acceptability level of farmers in four local government areas in Benue State. The specific objectives were to determine:

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1. Yield differences between introduced variety and indigenous variety
2. Yield differences between recommended plant population and farmers  practice
3. Economic benefit of introduced variety and recommended plant population over indigenous varieties and plant population used by farmers
4. Level of acceptability of the improved sweet potato variety and recommended plant        population by farmers in the study area.

**Research questions**

The study was designed to answer the following research questions:

1. Is there any differences in yield per hectare between introduced variety and indigenous     variety?
2. Does the recommended plant population performed better than plant population used by      farmers?
3. Is there any economic benefit of introduced variety and recommended plant population over the indigenous variety and plant population used by famers?
4. To what extent has the farmers accepted this innovation?

**Methodology**

On-farm trial was conducted in four villages (Pila-ucha, Atonko, Mbakua-Nanev and Ankar) sampled from four Local Government Areas (Markurdi, Gboko, Kwande and Vandeikya), respectively. Individual house hold interviews were conducted on ten families from each village; the household heads present were interviewed. The farmer who showed more interest in the interview was selected for the on-farm trial. The on – farm was conducted from late June to October 2015.

The on- farm area cultivated per farmer was 0.006ha ( 5m x 12m) 5 ridges 12m length spaced 1m apart. Design used was a 2 x 2 split plot in randomize complete block design. Treatments consisted of the two factors combination; planting densities (estimated farmers practice and recommended plant population of 33,333plt/ha), varieties (variety used in the area, and NRSP/05/007C). There was only one replicate per farmers plot, this was done based on the recommendation by Stroup *et al.,* (1991) and Mutsaers *et al.,* (1997) in Sooby (2014) who recommended a single replicate in each farmer’s field and the number of farmers farm become the number of replicates in the trial.

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Layout of the trial, trial monitoring, sowing of the trial, growing and trial management, harvesting and processing was done by the farmer supervised by the researchers, while data collection was done by the researchers. The farmers were guided on how to carry out good agronomic practices that will maximize yield as used in on-station experiments particularly usage of recommended plant population.

**Data collection**

 Data collection was limited to yield components, which are of farmers interest (Angula *et al*., 2009), Sweet potato yield data was collected on; Root length, Root girth, Number of roots per plant, number of marketable roots/plant, Number of unmarketable roots/plant and Net yield in t/ha.

**Data analysis**

Yield data collected were analyzed using analysis of variance as recommended by Versteeg and Huijsman (1991) and used by Pham and Stack, (2014) for on- farm analysis. Post harvest on - farm evaluation was done by usage of percentages, scoring and ranking technique and profitability analysis was carried out as recommended by Ogbonna *et al*.( 2009).

This was expressed as:

NR = GR – TC

R/N = NR/TC

Where NR = Net Return, GR = Gross Return, TC = Total Cost, R/N = Return per Naira.

**Results**

**Sweet potato yield component**

The effect of variety, plant population and site of planting on sweet potato number of roots per plant, root girth, root length, number of marketable and unmarketable roots per plant is as presented in Table 1. There was significant difference between the introduced variety (NRSP/05/007C) in number of roots with NRSP/05/007C recording higher number of roots per plant. There was significant increase in number of roots per plant as plant population was changed from 33,333plt/ha to farmer’s plant population. No significant difference was detected between sites.

Root girth was significantly increased when farmer’s plant population was used. Similarly, there was significant difference between introduced variety and indigenous variety, whereas sites showed no significant effect. There was no significant effect of plant population or sites on sweet potato root length. On the other hand, variety significantly affected root length with NRSP/05/007C showing significant difference from the indigenous variety tested. The introduced variety differed significantly on number of marketable and unmarketable root number per ridge. Marketable and unmarketable root number per ridge increased as 33,333plts/ha was used.

There was higher net yield with the introduced variety and plant population of 33,333plts/ha than when indigenous variety and farmers spacing was used. Vandeikya and Kwande sites yielded higher and significantly different from the other two sites (Gboko and Makurdi).

**TABLE 1:** **Farm performance of sweet potato as influenced by varieties and plant populations on yield characters in the   farmers field across four sites**

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|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors** | **Number of roots/plant** | **Root girth(cm)** | **Root length(cm)** | **Marketable root/ridge** | **Unmarketable root/ridge** | **Net yield/t/ha** |
| **Variety** |  |  |  |  |  |  |
| Indigenous | 2.57 | 3.56 | 10.93 | 6.46 | 10.81 | 9.21 |
| NRSP/05/007C | 3.75 | 4.05 | 9.23 | 8.66 | 19.56 | 14.23 |
| FLSD(0.05) | 0.16 | 0.40 | 1.01 | 0.51 | 1.81 | 3.22 |
| **Plant population** |  |  |  |  |  |  |
| 33,333plt/ha | 3.18 | 3.18 | 8.99 | 7.17 | 14.88 | 14.02 |
| <25,000plt/ha | 3.88 | 3.39 | 9.33 | 6.98 | 12.10 | 10.40 |
| FLSD(0.05) | 0.13 | 0.20 | NS | NS | 1.35 | 1.57 |
| **Site** |  |  |  |  |  |  |
| Vandeikya | 3.02 | 2.18 | 9.46 | 7.21 | 15.00 | 12.78 |
| Gboko | 3.04 | 3.08 | 8.43 | 7.04 | 14.21 | 11.63 |
| Makurdi | 3.06 | 3.67 | 9.29 | 7.00 | 12.36 | 10.64 |
| Kwande | 3.02 | 3.18 | 9.46 | 7.04 | 14.21 | 12.78 |
| FLSD(0.05) | NS | NS | NS | NS | NS | 0.68 |

**TABLE 2: Economic analysis of recommended plant population and   plant population used by farmers in the farmers field (₦)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Budget element** |  | **Plant population** | |  |
| **33,333 plants per hectare** | | **<25,000plants per hectare** | |
| Cost of production  Mean yield | 124,000.00  13.89 |  | 124,000.00  10.15 |  |
| Gross benefit | 277,800.00 |  | 202,900.00 |  |
| Net benefit | 153,800.00 |  | 98,900.00 |  |
| Rate of return per naira | 1.24 |  | 0.64 |  |

**TABLE 3: Economic analysis of introduced variety and indigenous variety in the farmers’ field (₦)**

|  |  |  |
| --- | --- | --- |
| **Budget element** | **Variety** | |
| **NRSP/05/007C** | **Indigenous variety** |
| Cost of production | 134,000.00 | 134,00.00 |
| Mean yield | 14.23 | 9.21 |
| Gross benefit | 225,680.00 | 147,360.00 |
| Net benefit | 91,480.00 | 13,360.00 |
| Rate of return per naira | 0.68 | 0.10 |

**Economic analysis**

Total cost of production, mean yield, gross benefit and rate of return per naira of variety and plant population are as presented in Tables 2 and 3.

Average yield of recommended plant population (13.89t/ha) was higher than that of farmers plant population (10.15t/ha). Recommended plant population had a gross benefit of ₦227,800/ha as against ₦202,900/ha of farmers plant population. Recommended plant population had a net return/benefit of ₦ 153,800/ha and ₦ 1.24 rate of return per naira, while farmers plant population produced ₦98,900/ha as net benefit and ₦0.64 rate of return per naira (Table 2). Also average yield of introduced variety (14,23t/ha) was higher than that of indigenous variety (9,21t/ha). Introduced variety had a gross benefit of ₦225,680/ha as against ₦147,360/ha of indigenous variety. NRSP/05/007C had a net return/benefit of ₦ 91,480/ha and ₦ 0.68 rate of return per naira, while indigenous variety produced ₦ 13,600/ha as net benefit and ₦0.10 rate of return per naira (Table 3).

**Table 4:** Ranking and scoring of sweet potato varieties and plant population for yield characters in the farmers’ field across four sites

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Site** | **Variety** | | **Planting density** | |
| **Local** | **NRSP/05/007C** | **33,333 plts/ha** | **Farmers practice** |
| Vandeikya | 2 | 1 | 1.1 | 1.8 |
| Gboko | 2 | 1 | 1.2 | 1.9 |
| Makurdi | 2 | 1 | 1 | 1.6 |
| Kwande | 2 | 1 | 1.2 | 1.8 |
| Mean | 2 | 1 | 1.13 | 1.98 |
| Score | 2 | 1 | 1 | 2 |

RANKING: 1 = GOOD, 2 = MODERATE, 3 = POOR.

**Evaluation of farmer’s acceptance level of technology in on-farm situation**

Ranking based on yield of sweet potato by farmers is as presented in Table 4 and Figure 1. The introduced variety NRSP/05/007C was mostly ticked as good (1), 65.56% of farmers preferred higher yield of 33,333plt/ha. However, only 34.44% of farmers preferred farmers’ plant population (Figure 1). Farmers’ opinion and response in the field during farmer’s group meeting and after trial showed that the farmers had high interest in the new technology. 87.2% accept that replacement of local/indigenous variety with NRSP/05/007C will be economically attractive.

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**Discussion**

 Fresh root yield of introduce variety (NRSP/05/007C) was higher than the indigenous variety; this could be as a result of the genetic potential and the adaptability of the introduced variety to the environment. Saleh *et al.* (2004) on on- farm evaluation of sweet potato discovered that most newly introduced variety performed better than the indigenous ones. Plant population used by farmers produced lower yield than population of 33,333plts/ha, this is probably due to lower population per unit area used by farmers.

On profit maximization of introduced variety, a net benefit of ₦ 91,480/ha was obtained and a rate of return per naira of 0. 68 were realized for every ₦ 1.00 invested in the production of the introduced variety. Ogbonna *et al.* (2009) obtained increased in net returns and high rate of return per naira when introduced variety were evaluated against landraces.

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 Evaluation of farmers’ preference level of the technology revealed that there was consensus among the farmers about the introduced variety (NRSP/05/007C) and farmers accepted that the yield differences between NRSP/05/007C and indigenous variety was impressive. This acceptance could have been because of the practical demonstration which according to Kaguongo *et al. (*2012) is an important factor in influencing the acceptance and adoption of sweet potato trial in any given area. Majority of the farmers from major sweet potato producing area accepted plant population of 33, 333 plants/ha.

**Conclusion and Recommendation**

Introduced sweet potato variety, indigenous variety, recommended plant population and farmer’s plant population were tested in Makurdi for yield component and economic benefit. Introduced variety yielded higher (14.23t/ha) with a net return of ₦ 91,480.00 over indigenous variety.

Farmers growing sweet potato in the study area are advised to use improved high yielding variety (NRCP/05/007C) and optimal plant population (at least 33,333 plants/ ha) for optimization of yield and economic benefit.

From the result obtained in this study, recommendations are made as follows:

1. More extension work need to be carried out to enlighten the farmers on need for improved high yielding sweet potato varieties and optimal plant population for optimization of yield.
2. Sweet potato should be grown at a plant population of 33.333plt/ha as to obtain optimal yield and economic benefit.
3. Higher yielding NRSP/05/007C variety of sweet potato should be introduced to farmers for adoption in view of the identified poor yields on the farmers’ field.

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**ENCOURAGING COMMUNITY LEADERS, INDUSTRIALISTS AND BUSINESSMEN IN FINANCING TECHNICAL VOCATIONAL EDUCATION AND TRAINING FOR SUSTAINABLE DEVELOPMENT IN NASARAWA STATE**

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**Abstract**

*The study focused on policy initiatives for encouraging Community leaders, Industrialists and Businessmen to participate in financing Technical Vocational Education and Training (TVET) for sustainable development in Nasarawa State. The study adopted a descriptive survey research design and was carried out in Nasarawa State. The population for the study was 354 respondents comprising 90 community leaders, 99 industrialists and 165 businessmen. Twenty one Policy Initiative items questionnaire was developed and utilized to collect data for the study. The instrument was validated by 5 experts, three from the Department of Industrial Technical Education, University of Nigeria, Nsukka and two from manufacturing industry. Cronbach Alpha reliability method was used to determine the internal consistency of the instrument. The reliability test on the items revealed a coefficient of 0.87. The study found out that 21 items were rated as cooperative financing initiatives that should be utilized in making community leaders, industrialists and businessmen participate in financing technical vocational education and training. It was also found that there was no significant difference in the mean rating of the respondents at 0.05 level of significant with regards to how technical vocational education and training be financed. It was therefore recommended that the findings in the study be utilized by government for formulating policies in financing technical vocational education and training in Nasarawa state.*

**Keywords:** Community leaders, Industrialists, Businessmen, Financing, Technical Vocational Education

**Introduction**

In its traditional sense, finance connotes the money used to run a business or a project. It also involves the money which is available to individuals, government or organizations for spending on various economic activities. Enyi (2011) articulates that finance involves not only raising money for projects, but also ensuring the effective utilization of the raised money. In most contexts, financing implies making direct monetary transactions. Within the context of community financing of Vocational Technical Education (VTE), restricting community efforts to monetary contributions will be deceptive. While recognizing the direct monetary contributions, much community support for vocational technical education is in non-monetary form, which comes in form of labour, donation of land, materials, equipment, facilities, etc. Nwankwo (2017) noted that these resources would have been purchased with money if they were not provided directly. This paper therefore recognizes the various monetary and non-monetary contributions community leaders, industrialists and businessmen make to vocational technical education and conceptualize them as financing. Accordingly, it incorporates the various forms of participation the community, industry and business sector make in the process of supporting vocational technical education.

It has been acknowledged that as a capital intensive venture, government is unable to single handedly fund education in general and VTE in particular (Diraso, John & Manabete, 2012). One disturbing issue however, is that the academia has over the years been in serious combat with government over the issue of funding, viewing it as inadequate, (Nnoli & Smith, 2016). The academia has viewed vocational technical education in Nigeria to be characterized by poor quality, obsolence, insufficiency,meddlesomeness, disincentiveness and inefficiency, (Umar, 2016). In view of this, it is absolutely necessary to encourage community leaders, captains of industries and businessmen to finance VTE for optimum benefits (Enyi, 2011). In Umar (2016), low level of funding has often been associated with the low image of Vocational Technical Education in the country. Olaitan (2012) remarked that even when the image of VTE is improved, it requires substantial funding to make it effective in meeting the needs of the school graduates, youths, stagnated adult workers, retired and disengaged adult workers for continuing economic livelihood. Because of proximity of Nasarawa State to the Federal Capital Teritory, Abuja, the population is increasing and bringing pressure on government to provide VTE and conducive learning environment without corresponding facilities.

Vocational technical education is expensive because of its heavy resource inputs such as tools; equipment and machines. Auta, (2015), observed that government alone cannot fund vocational technical education programme for empowering all the unemployed youths in Nigeria. In this connection, it becomes necessary to seek for assistance from community members, industrialists and businessmen; but with the low image accorded VTE, communities are skeptical of supporting government that nurtures programmes in vocational institutions in Nasarawa State. The industrialists on the other hand prefer investing part of their profits into school programmes that are less capital intensive and the little fund invested would be more appreciated by many students that are beneficiaries of the contributions. For community leaders, industrialists and businessmen to respond positively towards funding VTE, Jean (2011) concluded that they need to be mobilized and encouraged.

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Oujevvu (2013) explained that it is not for nothing that there have been persistent calls for involvement of communities in financing vocational technical education. Given the government’s inability to fund education single-handedly due to dwindling resources, increasing cost and demand for vocational technical education, it is imperative that financing of VTE should become the responsibility of all. Problem of inadequate funding exists in virtually all levels of vocational technical education, particularly at the tertiary level, where government is unable to maintain and expand facilities. Olembo (2013) stated that, though VTE is assumed to be vital to economic development has been regarded as an inferior or second class type of education and such perception has accorded this important field a very low funding. Oujer (2014) observed that the present situation of VTE programme in Nasarawa State is not different from what other states have put in place but these states aggressively addressed the concerns of the people for an improved and functional VTE as means of agricultural development, poverty reduction and economic buoyancy. Enyi, (2010) reported that there are little or no research evidences on policy initiatives for encouraging community leaders, industrialists and businessmen towards financing of vocational technical education. To improve funding in any type of education programme, Ugbalu (2012) observed that it is more rewarding through Policy formulated based on research findings. This paper addressed policy initiatives for encouraging community leaders, industrialists and businessmen in financing vocational technical education and training using empirical evidences.

Vocational technical education in (Olaitan & Alaribe, 2011) is defined as a type of education recognized internationally to provide skills for youths, adults and disengaged workers for the purpose of empowering them for employment to enable them earn some worthwhile material benefits to meet their needs. Contributing to the meaning of Vocational Technical Education, United Nations Educational, Scientific and Cultural Organization (UNESCO) (2012) stated that it is an integral part of general Education, a means of preparing people for occupational fields and for effective participation in the world of work, an aspect of life-long learning and a preparation for responsible citizenship, an instrument for promoting sound sustainable development and method of facilitating poverty alleviation. Similarly, the terms vocational and technical education are used jointly to mean education geared towards skill acquisition for gainful employment (Federal Government of Nigeria, 2013). In this study Vocational Technical Education is regarded as a type of education that could help individual to give more to his/her society economically than he/she is receiving from it. For communities, industries and businessmen to understand the objectives and respond positively towards participating in funding vocational education, there is need for policy initiatives with research evidences supporting the economic worth of vocational technical education.

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Policy according to Ukonze and Ohanu (2013) is a plan of action undertaken by government or group of persons to enable them accomplish an objective. In Miller (2013), policy is a government programme of action towards what the government intends to do or achieve (goal) and how it intends to do it (implementation). In this study, policy initiative means important research findings to be considered by government for making policies for funding vocational technical education. Initiatives are important new plans or processes identified in order to achieve a particular aim or solve a particular problem. In Nasarawa State, vocational technical education has been suffering from neglect because of a number of factors. One of these is lack of research studies on the economic worth of VTE which has been collected, analyzed and made open to policy makers to attract substantial support to vocational technical education programmes. The few studies conducted on vocational technical education in higher institutions are by research trainees whose results have never been made available to any government functionary, policy makers or consumers of vocational technical education. Such studies often end up in libraries and at times as publications in journals that serve the interest of the author rather than showing concern about the needs of government for developing policies that can promote vocational education towards empowering citizens for work.

Government alone cannot finance vocational technical education because of her diverse responsibilities and demand for finances. To this extent, there are often calls on community, industries and companies to assist government in financing vocational technical education but there has been no concerted research effort to identify the direction of the assistance by stakeholders, what they stand to benefit from the assistance, what type of assistance is required and its limit especially when everybody in the society is aware that education is a fundamental human right of the individual and should be provided by the government. This study therefore was designed to deveop policy initiatives for encouraging community leaders, industrialists and businessmen in financing VTE for sustainable economic recovery in Nasarawa State. Specifically, the study sought to identify:

1. Policy initiatives for encouraging community leaders, industrialists and businessmen in financing vocational technical education programme in Nasarawa State.
2. Policy initiatives for encouraging community leaders, industrialists and businessmen in managing funds contributed in support of vocational technical education programme in Nasarawa State.

**Research Questions**

1. What are the policy initiatives for encouraging community leaders, industrialists and businessmen in financing vocational technical education programme in Nasarawa State?
2. What are the policy initiatives for encouraging community leaders, industrialists and businessmen in managing funds contributed in support of vocational technical education programme in Nasarawa State?

**Hypotheses**

**Ho1:** There is no significant difference in the mean ratings of the responses of community leaders, industrialists and businessmen on policy initiatives for encouraging participation in financing vocational technical education programme in Nasarawa State.

**Ho2:** There is no significance difference in the mean ratings of the responses of community leaders, industrialists and businessmen on policy initiatives for encouraging participation in managing funds contributed in support of vocational technical education programme in Nasarawa State.

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**Methodology**

The design used in carrying out this study is the descriptive survey. The population for the study is 1,500 persons. From this population, 30% of each segment of the groups was drawn as sample for the study. According to Hawley (2013), 30% could be used for a study which population is up to one thousand five hundred and above. The composition of the sample comprises 165 businessmen, 90 community leaders, 99 industrialists. The total sample for the study stood at 354 respondents. The instrument for data collection was a four point structured questionnaire designed by the researchers. It was validated by 5 experts, 3 in the department of Industrial Technical Education and 2 industrialists in Lafia. Cronbach alpha was used to establish the reliability of the instrument. This yielded a reliability coefficient of 0.87. The instrument was administered by the researchers with the help of 4 research assistants appointed in the various zones in the study area. A total of 336 copies (95%) of the completed questionnaire were returned and analyzed. Mean and standard deviation were used to answer the research questions while ANOVA was utilized to test the hypotheses at p<0.05 level of significance.

**Results**

**Research Question 1**

What are the policy initiatives for encouraging community leaders, industrialists and businessmen to participate in financing vocational technical education programmes in Nasarawa State?

**Table 1: Mean Ratings, Standard deviation and Prioritization Ratings of the Respondents on Policy Initiatives for Encouraging Participation in Financing VTE Programmes in Nasarawa State N=354**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Item statement** |  | **SD** | **Prioritization (Ranking)** |
| 1 | Each member of the community should pay additional tax for financing VTE programmes in their environment | 2.64 | 1.00 | 6 |
| 2 | Industrialists should invest some percentage of their annual profit into financing VTE programmes in their environment | 3.27 | 0.75 | 2 |
| 3 | Industrialists should pay special occupational training levy for financing VTE programmes in their area | 3.19 | 0.85 | 4 |
| 4 | Businessmen should pay special occupational training levy for financing VTE programmes in their area | 2.98 | 0.87 | 5 |
| 5 | Businessmen should remit certain percentage of their profits monthly for financing VTE programmes for Poverty reduction organization | 3.25 | 0.85 | 3 |
| 6 | Businessmen and industrialists should accept the training of youths in their area of specialization and help to employ them for the purpose of expanding their production base and alleviate poverty of youths | 3.52 | 0.73 | 1 |

**Key: X= Mean SD= Standard Deviation**

**Table** 1 show that the mean values of items 1 – 6 rated by the stakeholders on policy initiatives for encouraging participation in financing VTE programmes in Nasarawa State range from 2.64 - 3.52; this indicates that the mean values of the six items are above the cut-off point of 2.50. This observation implies that all the six items are regarded as appropriate policy initiatives for encouraging stakeholders to participate in financing VTE programmes in Nasarawa State. The standard deviation values of the six items range from 0.73 - 1.00. This shows that the respondents are close to one another in their opinions and that they are not very far from the mean in their responses. This indicates that the means are dependable.

In terms of prioritization of the policy initiatives for encouraging community leaders, industrialists and businessmen in financing VTE programmes in Nasarawa State, item 6 rank first, item 2 rank second, 5 rank third, 3 rank fourth, 4 rank fifth and item 1 rank sixth. This implies that the respondents are concerned about item 6 that rank first which is, companies and industries should accept the training of youths in their area of specialization and help to employ them for this purpose of expanding their production base and alleviating poverty of youths. This is followed closely by item 2 that ranked second which is that industries / companies should invest some percentage of their annual profit into financing VTE programmes in their environment.

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**Research Question 2**

What are the policy initiatives for encouraging community leaders, industrialists and businessmen to participate in managing funds contributed in support of vocational technical education programmes in Nasarawa State?

**Table 2:** Mean, Standard deviation and Prioritization of the Respondents on Policy Initiatives for Encouraging Participation in Managing Funds Contributed in support of VTE Programmes in Nasarawa State N=354

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** | **X** | **SD** | **Prioritization**  **(Ranking)** |
| 1. | Community leaders, industrialists and businessmen to be recognized as members of governing Boards/Councils of VTE institutions in their environment | 3.39 | 0.75 | 1 |
| 2. | Stakeholders to be members of departments or faculties or school committees for the purchase or supplying of training facilities for VTE programmes in their area | 3.11 | 0.89 | 6 |
| 3. | Community leaders, industrialists and businessmen to participate in auditing of the funds they contributed and facilities for VTE in their communities. | 3.21 | 0.83 | 5 |
| 4. | Industrialists and businessmen should be paid to supply equipment and machines directly to VTE institutions with a long-term guarantee rather than the government using contractors as suppliers | 3.38 | 0.79 | 2 |
| 5. | Community leaders, industrialists and businessmen should belong to the disciplinary committee for the funds they contributed for VTE programmes in their area | 3.32 | 0.79 | 3 |
| 6. | A resource allocation and management commission should be set up by the government to collect and manage financial contributions by community leaders, industrialists and businessmen with representatives from the contributors and the government in respect of VTE. | 3.27 | 0.79 | 4 |

**Key: X= Mean SD= Standard Deviation**

Table 2 shows that the mean values of items 1 – 6 on the policy initiatives for encouraging community leaders, industrialists and businessmen to participate in managing funds for VTE programmes in Nasarawa State range from 3.21 – 3.39; this indicates that the mean values of the six items are above the cut-off point of 2.50. This observation implies that all the six items are regarded as policy initiatives, community, industry and businessmen can participate with government in managing funds for VTE programmes in Nasarawa state. The standard deviation values of the six items range from 0.75 – 0.89. This shows that the respondents are close to one another and that they are not very far from the mean in their responses. This adds value to the validity of the means.

In terms of prioritization of the policy initiatives for encouraging community, industry and businessmen to participate with government in managing funds for VTE programmes in Nasarawa State, item 1 rank first, item 4 rank second, 5 rank third, 6 rank fourth, 3 rank fifth and item 2 rank sixth. This implies that the respondents are mostly concerned about item 1 which ranked first, that is, community leaders, industrialists and businessmen to be recognized as members of governing boards or councils of VTE institutions in their environment. This is followed closely by item 4 which ranked second, that is, industries/companies should be paid to supply equipment and machines directly to VTE institutions with a long-term guarantee rather than the government using contractors as intermediaries.

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**Ho1:** There is no significant difference in the mean ratings of the responses of community leaders, industrialist and businessmen on policy initiatives for encouraging participation in financing vocational technical education programmes in Nasarawa State

Table 3: Analysis of Variance (ANOVA) of the Mean Ratings of the respondents on Community Leaders, Industrialists and Businessmen on the Policy Initiatives for Encouraging Participation in Financing VTE Programmes in Nasarawa State

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | **Item Statement** | **Sum of Square** | **Residual** | **F-ratio** | **P-values (S1g-)** | **E2** | **Rmk** |
| 1 | Each member of the community should pay additional tax for financing VTE programmes in their environment. | Between Groups 1.21  Within Groups 367.21  Total 368.41 | 1.60 | 0.61 | 0.55 | 0.99 | NS |
| 2 | Industrialists should invest some percentage of their annual profit into financing VTE programmes in their environment | Between Groups 0.25  Within Groups 207.40  Total 207.65 | 0.69 | 0.22 | 0.82 | 0.99 | NS |
| 3 | Industialists should pay special occupational training levy for financing VTE programmes in their area | Between Groups 4.02  Within Groups 264.09  Total 268.10 | 2.72 | 2.81 | 0.06 | 0.98 | NS |
| 4 | Businessmen should pay special occupational training levy for financing VTE programmes in their area | Between Groups 5.01  Within Groups 273.77  Total 273.78 | 3.25 | 2.38 | 0.55 | 0.98 | NS |
| 5 | Businessmen should remit certain percentage of their profits monthly for financing VTE programmes for Poverty reduction  organization | Between Groups 8.13  Within Groups 261.68  Total 269.81 | 4.77 | 5.74 | 0.03 | 0.98 | S |
| 6 | Businessmen and industrialists should accept the training of youths in their area of specialization and help to employ them for the purpose of expanding their production base and alleviate poverty of youths | Between Groups 1.85  Within Groups 197.31  Total 199.17 | 1.46 | 1.74 | 0.18 | 0.99 | NS |

**Significant at P ≤ 0.05 E2 = Correlation ratio**

Table 3 shows that the P-values of five out of six items are greater than 0.05. This indicates that there is no significant difference in the mean ratings of the responses of the three groups of the respondents on the five items as policy initiatives for encouraging community leaders, industrialists and businessmen to participate in financing VTE in Nasarawa State. Therefore, the hypothesis of no significant difference is upheld for the five items. The P-value of item 5 less than 0.05 indicating a significant difference in the mean ratings of the responses of the three groups of respondents, therefore, a hypothesis of no significant difference is rejected for item 5.

**Ho2:** There is no significant difference in the mean ratings of the respondents on community leaders, industrialists and businessmen on the policy initiatives to encourage participation in managing funds contributed in support of vocational technical education programmes in Nasarawa State

**Table 4:** Analysis of Variance (ANOVA) of the Mean Ratings of the respondents on Community leaders, Industrialists and Businessmen on the Policy Initiatives to Encourage Participation in Managing Funds Contributed in support of VTE programmes in Nasarawa State

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|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** | **Sum of** Square | **Residual** | **F-ratio** | **P-values**  **(S1g-)** | **E2** | **Rmk** |
| 1. | Community leaders, industrialists and businessmen to be recognized as members of governing Boards/Councils of VTE institutions in their environment | Between Groups 2.91  Within Groups 367.21  Total 368.41 | 2.01 | 2.64 | 0.07 | 0.99 | NS |
| 2. | Stakeholders to be members of departments or faculties or school committees for the purchase or supply of training facilities for VTE programme in their area | Between Groups 0.20  Within Groups 292.30  Total 292.49 | 0.89 | 0.12 | 0.88 | 0.99 | NS |
| 3. | Community leaders, industrialists and businessmen to participate in auditing of the funds they contributed and facilities for VTE training in their community | Between Groups 1.64  Within Groups 254.05  Total 292.49 | 0.89 | 0.12 | 0.88 | 0.99 | NS |
| 4. | Industrialists, businessmen should be paid to supply equipment and machines directly to VTE institutions with a long-term guarantee rather than government using contractors as suppliers | Between Groups 2.20  Within Groups 192.06  Total 192.83 | 1.72 | 1.78 | 0.17 | 0.99 | NS |
| 5. | Community leaders, industrialists and businessmen should belong to the disciplinary committee for the funds they contributed for VTE programmes in their area. | Between Groups 0.81  Within Groups 229.86  Total 230.67 | 1.03 | 0.65 | 0.52 | 0.99 | NS |
| 6. | A resource allocation and management commission should be set up by the government to collect and manage financial contributions by businessmen and industrialists with representatives from the contributors and the government in respect of VTE. | Between Groups 0.75  Within Groups 228.45  Total 229.19 | 0.99 | 0.60 | 0.55 | 0.99 | NS |

**Significant at P ≤ 0.05**

**E2 = Correlation ratio**

Table 4 shows that there is no significant difference in the mean ratings of the responses of the three groups of respondents (community leaders, industrialists and businessmen) on all the six items whose P-values are greater than 0.05. Therefore, the hypothesis of no significant difference is upheld for the six items.

**Discussion of the Findings**

The findings that the six policy initiative items had their mean values above the cut-off point of 2.50 and are regarded as policy initiatives for encouraging community leaders, industrialists and businessmen is in agreement with the conclusions of Jean (2011) and Ugbalu (2012). In their separate studies, the authors concluded that questionnaire items with mean values above 2.50 and standard deviation values higher than 0.66 are suitable for policy making formulation.

Findings from the hypothesis tested revealed that the three groups of respondents did not differ significantly in their responses on five out of six policy initiative items for encouraging community leaders, industrialists and businessmen in funding vocational technical education in Nasarawa State; but differ significantly in their responses on item 5 in table 1 that businessmen should pay special occupational training levy monthly for financing VTE programmes especially in their local community. This finding of the study is in consonance with the findings of Olaitan (2012) in a similar study on policy initiatives for effectiveness of vocational and technical education on rapid and sustainable national development, that private companies in their respective communities should remit 5% of their annual profit in support of vocational technical education. This finding is also in conformity with Onjevu (2013) in a study Assessing Technical and Vocational Education in Nigeria: A Situation Analysis of Kaduna Polytechnic, where the null hypothesis of no significant difference was accepted.

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The findings from this study also revealed that all the six policy initiative items based on their mean and standard deviation values are regarded as appropriate policy initiatives for encouraging community leaders, industrialists and businessmen for participation with government in managing funds contributed to support VTE programmes in Nasarawa State.

These findings are in consonance with the findings of Auta (2015) in a study on Policy measures for improving the administration of Technical Teacher Training Programme (TTTP) in Nigeria where the author found that 16 policy initiatives for planning, 7 for coordination, 13 for implementing and 8 for evaluating technical teacher training programme. The findings are also in conformity with the findings of Olaitan and Alaribe (2011) in a study on policy measures for improving effective teaching and sustainability of Agricultural Science in schools, 8 policy measures could be put in place to help school administrators and students enhance effective teaching of Agricultural Science in the schools.

The hypothesis tested on what should be the community leaders, industrialists and businessmen policy initiatives for participation with government in managing the funds contributed to support VTE programmes in Nasarawa State revealed that the three groups of respondents did not differ significantly on all the six items. These findings also agree with the findings of Okonze & Onuoh (2013) on a study “Evolving policy measures for promoting Agricultural Education in Teriary Institution in North Eastern Nigeria to reduce Youth Restiveness” where it was found that seven policy items were suitable for the study.

**Conclusion**

The study provided information on the utilization of policy initiatives for VTE policy formulation to encourage community leaders; industrialists and businessmen to participate in financing technical vocational education and training towards sustainable development in Nasarawa State. If the findings of this study are implemented by government for policy formulation, community leaders, industrialists and businessmen might become interested in contributing to support vocational technical education programmes in Nasarawa State.

The study provided information on the defects in government financing policy in financing effective and sustainable technical vocational education. The funding of vocational technical education could be improved and more attractive in the state if government adopts the findings of this study.

**Recommendations**

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1. Nasarawa State government should make use of the findings in this study for effective funding of vocational technical education in the State.
2. The Nasarawa State Ministry of Education should use the findings of the study and organize sensitization seminars for VTE Stakeholders in the state.

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**COTTON PRODUCTION SKILLS REQUIRED BY TEACHERS OF AGRICULTURAL SCIENCE FOR EFFECTIVE INSTRUCTIONAL DELIVERY IN SENIOR SECONDARY SCHOOLS IN THE NORTHERN EDUCATION ZONE OF TARABA STATE**

**BY**

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**Abstract**

*The study was carried out to determine the cotton production skills required by teachers of Agricultural Science for effective instructional delivery in Senior Secondary Schools in the Northern Education zone, of Taraba State. Three research questions guided the study while two hypotheses were formulated for the study. The study adopted survey research design. The study was carried out in the Northern education zone of Gombe State. The population of the study was one hundred and four (104) made up of ninety-four (94) teachers of Agricultural science and ten (10) Agricultural Extension Officers from the Ministry of Agriculture, Gombe State. There was no sampling due to the small size of the population. The instrument used for data collection was a- 50 item structured questionnaire which was face validated by three experts, one from the Department of Crop Production and two from the Department of Science Education (Agricultural Education Unit), Federal University, Kashere, Gombe State. Cronbach Alpha reliability method was employed to determine the internal consistency of the instrument and it yielded a coefficient of 0.89. One hundred and four copies of the instrument were administered on the respondents and were all retrieved. Mean and standard deviations were used to answer the research questions while t-test statistic was used to test the hypotheses of no significant difference at 0.05 level of significance and 102 degree of freedom. It was found out that all the 50 cotton production skills identified were required by teachers of Agricultural Science for effective instructional delivery in Senior Secondary Schools in the Northern Education zone of Taraba State. It was therefore recommended that the identified cotton production skills be integrated into the curriculum of crop production in Senior Secondary Schools. This will encourage the teachers to teach the topics effectively. The identified cotton production skills be integrated into the curriculum of skill acquisition centers for teaching the secondary school-leavers and unemployed tertiary institutions graduates.*

**Keywords:**Cotton, Production, Skills, Teachers of Agriculture, Effective Instruction.

**Introduction**

Before the era of oil boom, agriculture has been the mainstay of Nigerian economy. This was achieved through the cultivation of crops and rearing of animals. Varieties of crops were grown both for food supply and revenue generation. Among the cash crops cultivated in Nigeria and entire Africa was cotton.

Cotton belongs to the family of Malvaceae and the genus of Gossypium. Ogunlela (2004), stated that Nigeria started cotton production in 1903 with the British Cotton Growers Association taking the lead until it was disbanded and replaced by Cotton Marketing Board of Nigeria to develop, gin and market the produce. Cotton as explained by Wegerich (2012) is a soft and fluffy stable fibre that grows in a ball or a capsule around the seed of cotton. The fibre is cellulose while the plant is a shrub of average height, native to tropical and sub-tropical regions and the world including America, Africa and India. Cotton is a drought and salt resistant crop, the qualities that makes it an attractive crop for arid and semi-arid regions. A perennial crop that is widely grown in Northern Nigeria in states such as Kaduna, Katsina, Sokoto, Bauchi, Taraba, Kano, Zamfara, Benue and parts of Edo, Oyo and Ondo States.

There are many varieties of cotton. Iwena (2015) enumerated the varieties of cotton as Gossypium hirsutum, Gossypium peruvianum (meko cotton), Gossypium vitifolium, Ishan type and Samaru. Other varieties as outlined by Ogunlela (2004) are Gossypium barbadense Gossypium arboreum and Gossypium herbaceum. Cotton needs an average rainfall between 65cm-125cm with a temperature of 250c-350 c. It is mainly planted in June to July while the bolls that contain the cotton splits open at maturity and the cotton is handpicked or mechanically harvested by a cotton picker or stripper. Cotton is of great importance, apart from the income and foreign exchange obtained by the farmers and the Federal Government through the sale. Iwena (2015) and Ogieva (2003) explained that cotton is used in producing pharmaceutical cotton wool; the lint is used in textile industry in producing different kinds of clothes, bandages and other sanitary materials. From cotton we have cotton seed oil for cooking. The fuzz can be used to manufacture paper; it is incorporated into batting for padding mattresses, furniture and automobile cushions. The oil is used for the production of salad oil, cosmetics, soaps, candles and paints. Cotton is also a source of cellulose products, fertilizer, pressed paper and cardboard.

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Northern Nigeria according to Hussaini (2018) experienced unprecedented growth in the history of Africa, by 1987, Nigerian textile had grown to be the third largest in Africa attracting investment from China and India with over 170 urban textile mills and about 600,000 skilled and unskilled labour engaged in the industrial production and earning their living through it. However Gbenga (2017) stated that the neglect of cotton farming partly explains the death of our once flourishing textile industries. Due to the negligence on the part of Federal and State Governments according to Finelib (2016), the cultivation and exportation have been reduced greatly. It further explained that there are fears that cotton might go into extinction if proper and adequate measures are not followed, because what was formerly produced from cotton in Nigeria is now majorly imported. In order to bring back the lost glory in cotton production, Ogunlela (2004) stated that the Federal Government of Nigeria in September 2017 released a sum of 54 billion Naira to boost mass production of cotton in the country. The author explained further that the Federal Government also demonstrated its commitment by signing a memorandum of understanding with West African Cotton Company (WACOT) in order to revive cotton production in Nigeria. If the production of cotton is to be boosted and the revenue from it increased, the would-be cotton farmers have to be trained in the relevant skills required for cotton production.

Skill in the view of Harper (2014), is the knowledge and ability that enables individuals to do something well. It is a special ability in a task acquired by training Osinem (2008) stated that skills is the ability to do something well. It refers to the ability to perform an act expertly. The author further said it is a proficiency displayed in the performance of a task. In the opinion of Adam (2018), a skill is an ability and capacity acquired through deliberate, systematic and sustained effort to smoothly and adaptively carry out complex activities or job functions involving ideas (cognitive skill) things (technical skill) and/or people (interpersonal). In the context of this study, skills are the ability and capacity that are required to carry out the various activities in pre-planting, planting, post planting and marketing operations for the production of cotton. The skills are taught by the teachers of agricultural science. A teacher of agricultural science in the opinion of Olaitan, Asogwa and Assouzu (2010) is an individual who is trained in pedagogical and in technical areas of agriculture and is charged with the responsibilities of imparting knowledge, skills and attitudes to students. Agricultural science teacher according to Agcareer.com (2018) is an individual that is responsible for the education of agriculture, food science and natural resources for students. The author further explained that Agricultural Science teachers can give vital skills that are important in agricultural industry to students. Teachers of Agricultural Science are to impart knowledge, skills and attitudes in various aspects of crop production to students in senior secondary schools especially in the area of cotton production.

Production as defined by Harper (2004) is the process of manufacturing or growing something in large quantities. Jhingan in Ukonze (2010) explained that production is the use of land, labour, capital and entrepreneur to produce output needed to satisfy the consumers. In this study therefore, production is the process of combining land, labour, capital and various skills in pre-planting, planting, post planting and harvesting for the purpose of cotton production. It is noteworthy to mention therefore that any teacher of agricultural science that would want to impart skills, knowledge, attitudes in cotton production must possess those skills for effective instructional delivery to senior secondary school students in Northern education zone of Taraba State.

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In the area of the study the researchers observed through interaction with the teachers that teachers of agricultural science in senior secondary schools do not show enough interest in the teaching of cotton production. The teachers do not lay emphasis nor encourage the students in studying cotton production. This observation may be as a result of the teachers little or lack of knowledge and skills in areas of cotton production. It may also be that the teachers were not well taught in the theoretical and practical aspects of cotton production. The lack of interest may have also arisen from the negligence on the part of the Taraba State Government and lack of motivational -incentives for teachers of agricultural science on the part of the Ministry of Education that could lead to effective instructional delivery. If the students are to be well taught in areas of crop farming especially in cotton production, so that the objectives of senior secondary schools agricultural science as outlined by Nigerian Educational Research and Development Council (NERDC 2009) will be achieved, teachers of agricultural science require relevant skills in cotton production for effective instruction that will lead to the achievement of the objectives.

The objectives which are to:-

* stimulate and sustain students interest in agriculture
* impart functional and practical skills in agriculture
* prepare students for further studies in agriculture and
* prepare students for occupation in agriculture

To achieve the objectives stated above, it is therefore necessary to find out the cotton production skills required by teachers of agricultural science for effective instructional delivery to the senior secondary school students in the Northern education zone of Taraba State.

Effective Instruction as Stated by Nancy and Shirley (2006) is the systematic use of selected techniques, methods and strategies to create a dynamic interface between the curriculum and the learners. Stengerg in Lawal (2013) defined effective instruction as the use of various techniques and methods used in presenting the subject matter content to students in an organized manner. The author explained that it is used for focusing presentation (delivery) on teaching goals and creating possibilities for exercising in order to meet the learners’ needs and interests. In the context of this study, effective instruction is the transfer of relevant cotton production skills through the use of various methods and techniques by the teachers of agricultural science to senior secondary school students for effective instructional delivery in the Northern education zone in Taraba State in an organized manner. Thus, effective instruction is obtained when a teacher of agricultural science has taught, evaluated his instruction and the result revealed a positive change in the behavior of the students.

The purpose of this study therefore is to determine the cotton production skills required by teachers of agricultural science for effective instructional delivery in senior secondary schools in the Nothern education zone of Taraba State.

Specifically the study sought to determine the cotton production skills required by teachers of agricultural science in:

1. Planning and pre-planting operations of cotton production for effective instructional delivery in senior secondary school in the Northern education zone of Taraba State.
2. Planting operations of cotton production for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba State.

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1. Post – Planting operations of cotton production for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba State.
2. Marketing operations of cotton production for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba State.

**Methodology**

Survey research design was adopted for the study. Survey research design according to Nworgu (2006) is a design in which a group of people or items are studied by collecting and analyzing data from a few people or items considered to be the representative sample. The data could be collected using either observation or interview schedule or questionnaire. The design is appropriate for this study since questionnaire was used to collect data for the study.

The study was carried out in the Northern education zone of Taraba State. The zone is made up of Karim Lamido, Jalingo, Lau Ardokola, Yorro and Zing Local Government Areas.

The population for the study was one hundred and four (104), made up of ninety-four (94) teachers of agricultural science in the Northern education zone and ten (10) lecturers of tertiary institutions in Taraba State. The population constituted the sample for the study. Four research questions guided the study and two hypotheses were formulated for the study. A-50 skill item questionnaire was developed from literature reviewed and used for data collection. The questionnaire was made up of four (4) parts. Part one was on the planning and pre planting operations of cotton production for effective instructional delivery. Part two was on the planting operations of cotton production. Part three was on the post planting operations of cotton production while part four was on the marketing operations of cotton production for effective instructional delivery.

Each part of the questionnaire had four response scale options of highly required (HR), Averagely required (AR), Slightly required (SR) and Not required (NR) with a corresponding value of 4, 3, 2 and 1 respectively.

Three experts face validated the instrument. Two from the Department of science Education (Agricultural Education Unit) and one from the Department of Crop science, all from Federal University of Kashere, Gombe State. Cronbach Alpha reliability method was used to determine the reliability of the questionnaire items and it yielded reliability co-efficient of 0.89. The questionnaire was used in collecting data from the teachers of agricultural science in public secondary schools and lectures of tertiary institutions in Taraba state. (Federal University, Wukari, Taraba state University Jalingo, College of Education, Zing Jalingo) One hundred and four (104) copies of the questionnaire were administered on the respondents and were all retrieved.

Mean and standard deviation were used to answer the research questions while t-test statistic was used to test the hypotheses at p≥0.05 level of significance and at 102 degree of freedom. The real limit of numbers was used to take a decision on the skill items. The real limit of the response opinions are as follows:

Highly Required (HR)-3.50-4.00

Averagely Required (AR) -2.50-3.49

Slightly Required (SR) – 1.50-2.49

Not Required (NR) – Less than 1.50

Any item whose mean is 1.50 and above was regarded as required while any item whose mean is less than 1.50 was regarded as Not required

The standard deviation was used to determine the closeness or otherwise of the opinion of the responses from the mean. A low standard deviation indicates that the responses tend to be very close to the mean whereas high standard deviation indicates that the respondents are very far from the mean.

In testing the hypothesis of no significant difference, any item whose t-calculated value is less than t-tabulated value was regarded as not significant while any item whose t-calculated value is greater than or equal to t-tabulated value was regarded as significant.

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**Results**

The results for this study were obtained from the research questions answered and hypotheses tested through the data collected and analyzed.

**Research Question 1**

What are the skills required by teachers of agricultural science in planning and pre-planting operations of cotton production for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba State.

**Hypothesis 1**

There is no significant difference in the mean ratings of the responses of teachers of agricultural science in secondary schools and lecturers of crop science in tertiary institutions in Taraba state on the skills required by teachers of agricultural science in planning and pre-planting operations of cotton production for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba state.

Data for answering research question one and hypothesis one were presented in Table 1.

**Table 1**

Mean ratings and t-test results of the responses of teachers of agricultural science and lecturers in tertiary institutions on the planning and pre-planting operations of cotton production skills for effective instructional delivery in senior secondary schools in the Northern Education zone of Taraba state.

**N=104**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | Planning Operations: Item Statement | **X** | SD | t-cal | t-tab | Remarks  Ho | |
| A | Planning: |  |  |  |  |  |  |
| 1 | Formulate specific objectives for the production of cotton | 2.49 | 1.12 | 0.91 | 1.96 | SR | NS |
| 2 | Revise the objectives of cotton production to meet the demand of textile industry | 2.20 | 1.09 | 1.20 | 1.96 | SR | NS |
| 3 | Draw up programme plan for cotton production | 1.79 | 1.15 | 1.24 | 1.96 | SR | NS |
| 4 | Decide on the location of the production of cotton | 2.65 | 1.17 | 0.71 | 1.96 | AR | NS |
| 5 | Acquire suitable site (land) for production of cotton | 2.37 | 1.72 | 0.90 | 1.96 | SR | NS |
| 6 | Decide on the technique of production | 2.30 | 1.07 | 1.34 | 1.96 | SR | NS |
| 7 | Identify relevant inputs needed for the production of cotton | 2.27 | 1.14 | 1.15 | 1.96 | SR | NS |
| 8 | Draw up schedule to cover different activities for the production of cotton | 2.59 | 1.56 | 1.22 | 1.96 | AR | NS |
| 9 | Make budget and identify sources of funds for the production of cotton | 2.23 | 1.06 | 0.95 | 1.96 | SR | NS |
| 10 | Identify highly skilled instructor for cotton production | 2.82 | 1.18 | 1.06 | 1.96 | AR | NS |
| B | Pre-planting operations:- |  |  |  |  |  |  |
| 11 | Select a fertile land with pH range of 5-8 | 2.58 | 1.16 | 0.75 | 1.96 | AR | NS |
| 12 | Survey the land to indicate boundaries | 2.26 | 1.04 | 1.64 | 1.96 | SR | NS |
| 13 | Clear the land of existing weeds/vegetation | 2.42 | 1.01 | 1.55 | 1.96 | SR | NS |
| 14 | Pack the refuse and burn | 2.29 | 1.64 | 1.31 | 1.96 | SR | NS |
| 15 | Stump the stems and roots on the farmland before tillage | 2.35 | 1.48 | 1.65 | 1.96 | SR | NS |
| 16 | Till the soil by ploughing and harrowing | 2.26 | 1.32 | 1.34 | 1.96 | SR | NS |
| 17 | Make ridges or mounds for planting cotton | 2.77 | 1.24 | 1.25 | 1.96 | AR | NS |
| 18 | Select appropriate cultivar/variety of cotton for planting and carry out germination test | 2.75 | 1.72 | 1.36 | 1.96 | AR | NS |
| 19 | Establish the nutrient status of the soil before planting | 1.97 | 1.15 | 1.27 | 196 | SR | NS |

KEY = X = mean of the respondent; SD= standard deviation; +- cal +- calculated value; t- table; NS = not significant; AR = averagely required; SR = slightly required.

The data presented in Table 1 above revealed that the 19 planning and pre-planting operations of cotton production skills for effective instructional delivery had their mean value ranged from 1.79 to 2.77 and they were above the real limit of 1.49 indicating that all the 19 planning and pre-planting operations of cotton production skills were required for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba state.

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The standard deviation of the 19 planning and pre-planting operations of cotton production skill had their items ranged from 0.71 to 1.65. This showed that the respondents were not too far from the mean and from one another in their opinion. This added value to the validity of the mean

Table 1 also revealed that each of the 19 planning and pre-planting operations of cotton production skills had their calculated t-value less than the t-table value of 1.96 at 0.05 level of significance and at 102 degree of freedom. This indicated that there was no significant difference in the mean ratings of the two groups of respondents (teachers of agricultural science and lecturers in tertiary institutions). Therefore, the null hypothesis of no significant difference was upheld for the 19 planning and pre-planting operations of cotton production skills.

**Research Question 2**

What are the skills required by teachers of agricultural science in planting operations of cotton productions for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba state?

**Hypothesis 2**

There is no significant difference in the mean ratings of the response of teachers of agricultural science in secondary schools and lecturers in tertiary institutions in Taraba state on the skills required by teachers of agricultural science in planting operations of cotton production for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba state

Data for answering research question two and hypothesis two were presented in Table 2

**Table 2**

Mean ratings and t- test results of the responses of teachers of agricultural science and lecturers in tertiary institutions on the planting operations of cotton production skills for effective instructional delivery in senior secondary schools in the Northern Education zone of Taraba state.

**N=104**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | Planting operations (item statement)  Ability to | X | SD | t-cal | t-tab | Remarks  HO | |
| 1 | Determine suitable time for planting (June –July) | 2.69 | 0.16 | 1.04 | 1.96 | AR | NS |
| 2 | Select only viable seeds for planting | 1.80 | 1.34 | 0.98 | 1.96 | SR | NS |
| 3 | Treat seeds with appropriate fungicides before planting | 2.79 | 1.15 | 0.88 | 1.96 | AR | NS |
| 4 | Sow 4-5 seeds per hole | 2.50 | 0.76 | 1.25 | 1.96 | AR | NS |
| 5 | Plant seeds at a depth of 2-3cm | 1.69 | 0.69 | 0.91 | 1.96 | SR | NS |
| 6 | Maintain a space row of 25cm apart on ridges with 40-75cm between plants | 2.38 | 1.05 | 0.76 | 1.96 | AR | NS |
| 7 | Check for germination between 5-7 days | 2.40 | 0.47 | 0.99 | 1.96 | AR | NS |
| 8 | Supply ungerminated seeds after one week of initial germination | 2.89 | 0.71 | 0.86 | 1.96 | AR | NS |

**Key =as in table 1**

The data presented in table 2 above showed that the 8 planting operations of cotton production skills for effective operational delivery had their mean value ranged from 1.69 to 2.89 and they were above the real limit of 1.49 indicating that the 8 planting operations of cotton production skills were required for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba state. The standard deviation of the 8 planting operations of cotton production skills items ranged from 0.16 to 1.34. This indicated that the respondents were not far from the mean and from one another in their opinion. This lends credence to the validity of the mean.

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Table 2 also showed that each of the 8 planting operations of cotton production skills had a calculated t-value less than the t-table value of 1.96 at 0.05 level of significance and at 102 degree of freedom. This indicated that there was no significant difference in the mean ratings of the two groups {teachers of agricultural science and lecturers in tertiary institutions). Therefore, the null hypothesis of no significant difference was upheld for the 8 planting operations of cotton production skills.

**Research questions 3**

What are the skills required by teachers of agricultural science in post-planting operations of cotton production for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba state?

Data for answering research question three were presented in table 3

**Table 3**

Mean ratings of the responses of teachers of agricultural science and lecturers in tertiary institutions on the post-planting operations of cotton production skills for effective instructional delivery in senior secondary schools in the northern education zone of Taraba state.

N=104

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Post-planting operation item statement  Ability to | X | SD | REMARKS |
| **A** | **Post-planting operations** |  |  |  |
| 1 | Thin the seedlings to required number of two seedling per stand | 2.68 | 1.09 | AR |
| 2 | Weed farm early enough to avoid competition for soil nutrients 2 weeks after sowing | 2.08 | 0.99 | SR |
| 3 | Apply nitrogenous fertilizer at the rate of 50-60kg/ha and super phosphate at the rate of 20-25kg/ha | 2.19 | 1.07 | SR |
| 4 | Apply insecticides and fungicides to control pest and diseases | 1.78 | 1.05 | SR |
| 5 | Carry out topping techniques 80-90 days after plant growth | 1.94 | 1.02 | SR |
| 6 | Examine flowering to boll opening 40-180 days depending on the variety | 2.06 | 1.06 | SR |
| 7 | Check maturity of cotton 5-8 months after planting | 1.87 | 1.12 | SR |
| 8 | Harvest the matured bolls of cotton when they burst open in December to January in dry region and February to March in wet region | 2.45 | 1.08 | SR |
| **B** | **Harvesting operations** |  |  |  |
| 9 | Pick cotton when 10% of the bolls burst open | 2.71 | 0.92 | AR |
| 10 | Hand pick and sundry matured bolls | 1.96 | 1.35 | SR |
| 11 | Harvest cotton mechanically by cotton picker or stripper | 2.04 | 1.10 | SR |
| 12 | Transport harvested cotton to market or buying agents. | 2.08 | 1.06 | SR |
| **C** | **Processing operations** |  |  |  |
| 13 | Sundry the harvested cotton | 2.50 | 1.09 | AR |
| 14 | Take cotton intended for export to cotton ginnery after being dried | 2.87 | 0.87 | AR |
| 15 | Separate the seeds from the lint, remove fibre and other foreign materials from the cotton | 1.55 | 1.30 | SR |
| 16 | Take cotton lint to textile industry and spinning mills | 2.19 | 1.05 | SR |
| 17 | Store in a sack/bag/container and keep in a dry place | 1.94 | 1.10 | SR |

**Key as in Table 1**

The data presented in table 3 above revealed that the 17 post-planting operations of cotton production skills for effective instructional delivery had their mean value ranged from 1.55 to 2.87 and they were above the real limit of 1.49 indicating that the 17 post-planting operations of cotton production skills were required for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba state. The standard deviation of the 17 post-planting operations of cotton production skill items ranged from 0.87 to 1.35. This indicated that the respondents were not far from the mean and from one another in their opinion.

**Research Question 4**

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What are the skills required by teachers of agricultural science in marketing operations of cotton production for effective instructional delivery in senior secondary school in the Northern education zone of Taraba state

Data for answering research question four were presented in Table 4

**Table 4**

Mean ratings of the responses of teachers of agricultural science and lectures in tertiary institutions on the marketing operations of cotton production skills for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba state.

**N=104**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Marketing Operations**  **Item Statement: Ability to:-** | X | **SD** | **REMARKS** |
| 1. | Carry out market survey for the sale of cotton | 2.36 | 1.117 | SR |
| 2. | Contact cotton marketing agents and middlemen to advertise the commodity | 2.01 | 0.99 | SR |
| 3. | Fix prices for each grade depending on the quality | 2.13 | 1.08 | SR |
| 4. | Get a sales book record for cotton production and sales | 1.96 | 0.87 | SR |
| 5. | Determine turnover profit and re-investment sustainability | 2.16 | 1.14 | SR |
| 6. | Keep appropriate records of expenses sales off cotton and any other relevant record | 2.09 | 1.02 | SR |

**Key as in table one 1**

The data presented in table 4 above revealed that the 6 marketing operations of cotton production skills for instructional delivery had their mean value ranged from 1.96 to 2.36 and they were above the real limit of 1.49 indicating that the 6 marketing operations of cotton production skills were required for effective instructional delivery in senior secondary schools in the Northern educations zone of Taraba state.

The standard deviation of the 6 marketing operations of cotton productions skills items ranged from 0.87 to 1.17. This indicated that the respondents were close to the mean and one another in their opinion.

**Discussion of Results**

From the study, it was found out that the respondents (Teachers of agricultural science and lecturers in tertiary institutions) agreed that all the nineteen cotton production skills in planning and pre-planting were required for effective instructional delivery in senior secondary schools in the Northern education zone in Taraba state. The findings on planning and pre-planting operations in cotton production skills were in agreement with the findings of Ukonze (2016) who conducted a study on vegetable production skills needed by instructors in universities for effective teaching of vegetable crop in Enugu state where it was found out that instructors in universities needed all the sixteen (16) vegetable production skills in planning for effective teaching. The study revealed that instructors in universities needed to formulate objectives for vegetable production, review objectives based on change in demand, acquire suitable land, draw programme plan and budget for various activities among others. The findings on pre-planting operations were in line with the findings of Ogungbade, Alkali and Ibekwe (2010) who carried out a research on work skills required by secondary school graduates for entry into groundnut production enterprises in Kaduna state where it was found out that secondary school graduates required all the ten (10) work skill items in pre-planting activities in groundnut production. The findings showed that secondary school graduates needed to clear the land of existing vegetation, gather and burn the debris, till the land and select good quality seeds for planting

The findings from the hypothesis indicated that there was no significant difference in the mean ratings of the responses of teachers of agricultural science and lecturers in tertiary institutions on the planning and pre planting operations of cotton production skills required by teachers of agricultural science for effective instructional delivery.

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Findings on research question two revealed that the teachers of agricultural science required all the eight skills in planting operations of cotton production for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba state. The findings were in consonance with the findings of Amusa, Alkali and Oketoobo (2016) who conducted a research on the in service training needs of instructors for effective teaching of soya bean production to students of schools of agriculture in North central Nigeria where it was found out that all the ten (10) planting operation skills were needed by instructors for effective teaching of soya bean production. The findings revealed that instructors in schools of agriculture in North central Nigeria needed to sow 3-4 seeds per hole, sow at 2-3cm deep and replace ungerminated seeds among others. The findings from the hypothesis revealed that there is no significant difference in the mean ratings of the responses of teachers of agricultural science and lecturers in tertiary institutions on the planting operations of cotton production skills required by teachers of agricultural science for effective instructional delivery.

The findings on research question three (3) also revealed that there are seventeen (17) cotton productions skills items in post-planting operations. All the seventeen (17) skill items were required by teachers of agricultural science for effective instructional delivery. The findings were in line with the findings of Lawal (2016) who carried out a study on work skills improvement needs of graduates of schools of agriculture for commercial production of pigeon pea in South-west Nigeria where it was found out that the graduates of schools of agriculture needed all the twenty two (22) work skill items in post-planting operations for commercial production of pigeon pea. The findings showed that graduates of schools of agriculture needed to weed the farm, apply fertilizer, check for maturity of fruits, dry harvested fruits under the sun, store processed seeds in sack and carry out market survey among others.

Findings on research question four (4) revealed that the teachers of agricultural science required the six (6) skills in marketing operations of cotton production for effective instructional delivery in senior secondary schools in the Northern education zone of Taraba State . The findings were in agreement with the findings of Nebechukwu (2007) on work-skills needed by secondary school graduates for entering into coco yam production enterprise in Enugu state Nigeria where it was found out that ten (10) skills in marketing operations of cocoyam were required for success in the farm enterprise.

**Conclusion**

From the result of this study, it was discovered that teachers of agricultural science in the Northern education zone in Taraba State required cotton production skills to be able to deliver effectively the content of the curriculum in cotton production. Their areas of need as identified by this study are in planning, pre-planting, planting, post-planting and marketing of cotton produce. If the objectives of senior secondary school agriculture as outlined in the curriculum are to be achieved, teachers of agriculture science require relevant skills in crop production. If the findings of these study i.e cotton production skills are used in retraining the teachers, it will make their instructions effective, boost their morale, students will acquire theoretical knowledge and practical skills and the objectives of the agricultural science curriculum will be achieved.

**Recommendations**

Based on the findings of this study, it was recommended that:

1. The identified cotton production skills should be integrated into the curriculum of crop production in senior secondary schools by the Ministry of Education. This will encourage the teachers of agricultural science to teach the topic effectively thereby leading to skill acquisition on the part of the students
2. Taraba state government should integrate the cotton production skills into the curriculum of the skill acquisition centers through the Ministry of Education. This can be used to train the unemployed graduates of tertiary institutions and secondary school leavers so that they can go into the production of cotton offer their training

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1. The Federal and State governments should motivate the teachers of agricultural science in cash and kind so that the teachers of agricultural science will have job satisfaction and be effective and efficient in the classroom and out of the classroom work.

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**INITIATIVES REQUIRED FROM ADMINISTRATORS ON EFFECTIVE MANAGEMENT OF FACILITIES IN TECHNICAL COLLEGES IN NORTH-EAST NIGERIA**

**BY**

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***Abstract***

*The study investigated the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria. It answered one research question and tested one hypothesis. Descriptive survey research design was adopted where data were collected from 390 valid copies of a structured questionnaire, consisting of 75 administrators, 135 technical teachers and 180 students. The Statistical Package for Social Sciences (SPSS) version 17 was used for data analysis to determine the mean and standard deviation for answering the research questions and for determining the analysis of variance for testing the hypothesis at 0.05 level of significance. The study found that the initiatives required from administrators on the management of facilities in technical colleges in North-East Nigeria were moderately effective. The study also found that there was a significant difference in the mean scores of administrators, teachers and students on the initiatives required from administrators on the effective management of workshop facilities. The result of a Scheffe post hoc test revealed that students were responsible for creating the significant difference in the mean scores of the respondents. The findings of the study implied that technical college administrators needed to do more in the area of facilities management. This entailed that the facilities if not effectively managed, would be exposed to waste, theft and vandalization, which would in the end, affect students’ practical work. The study recommended that administrators of the technical colleges needed to improve on their initiatives for effective facilities management, among which are setting up a facilities procurement committee, taking inventory of all facilities, putting in place a preventive maintenance method, and supervision of facilities maintenance programme*

**Keywords**: College Administrator Effectiveness Facilities Management Technical College

**Introduction**

Technical colleges, regarded as the principal vocational institutions in Nigeria that give full vocational training to students, are institutions for achieving the goals of technical and vocational education (TVE). They train individuals in trades such as Block-laying and Concreting, Electrical Installation, Radio, Television and Electronic Work, and Welding and Fabrication (Omotosho, 2000; FRN, 2011).According to (Okoro,2006), the technical colleges provide a three-year training that leads to the award of an “O” level certificate known as the National Technical Certificate (NTC) or the National Business Certificate (NBC). Initially, graduates were awarded the City and Guilds/WAEC (Technical) Certificate

In order to achieve the goals of technical and vocational education (TVE), technical colleges need to be properly managed. The term “management”, according to Emmer (1992), refers to the utilization of resources for the achievement of set objectives. The United Nations Educational and Scientific Organization (UNESCO) in Ede (1997) defined management as a social process which is designed to ensure the cooperation, participation, interaction and involvement of others in the effective achievement of a given objective. Buttressing this point, Okeke (2001) defined management as a term that deals with the process of accomplishing objectives with available resources. For this paper, management is seen as the search for the best use of human and material resources towards the realization of the goals of technical colleges, using the management functions of planning, organizing, staffing, directing and controlling, reporting and budgeting.

There are certain factors that affect the management of technical colleges. One of such factors is facilities management initiatives by college administrators. In North-East Nigeria, facilities management initiatives by college administrators are not effective. In other words, generally ineffective management of workshop facilities constitutes a serious challenge to the management of technical colleges.

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The term “facilities management” is taken to mean the “systematic supporting service carried out on facilities to ensure their continuous use” (Nubia, 2000:99). In many schools and colleges however, Dalha in Abdulkadir (2001) reported that many tools and equipment were left to rot away in Hungarian containers. Mkpa (2001) added that some of the tools and equipment were vandalized and carted away. The consequence of this was that, as Ezeigbo in Nnamdi(2001) argued, many products of the technical college system graduated without acquiring the skills and knowledge that would make them functional members of the society

**Purpose of the Study**

To determine the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria.

**Research Question**

What are the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria?

**Hypothesis**

There is no significant difference in the mean scores of administrators, teachers and students on the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria.

**Review of Related Literature**

The study is based on the social systems theory whose major proponent was Talcott Parsons, America’s preeminent social theorist throughout the mid-20th century (Wikibooks, n.d.). Parson’s social systems tended towards equilibrium as the society members’ actions are to a significant degree oriented toward a single integrated system of ultimate goals common to the members (Parsons in Heyl, 1968). According to Hoy and Miskel (1982), a social system is a model organization that possesses a distinctive total unity beyond its component parts, made up of subunits, elements and subsystems that are interrelated. A social system has been defined by Hoy and Forsyth (1986:16) as a set of interacting personalities characterized by interdependencies of elements, complex networks of social relationships, with individual actors motivated by their personalities; it has “distinctive unity that goes beyond its component parts, and interaction with its environment (open system).”

In management, major advocates of the social systems theory are Getzel and Guba who presented two elements or subsystems of the social systems theory, namely, the nomothetic dimension and the idiographic dimension (Edem, 2006). According to Ukeje, Okorie and Nwagbara (1992:120), “Each of the two subsystems taken separately explains a portion of behaviour in a social system in sociological and psychological terms.” The authors held that the nomothetic dimension, also called the institutional subsystem, is made up of “the activities and functions of the social system that are accomplished in a fairly stable fashion.” The idiographic dimension is also referred to as the personal subsystem. It deals with the individual in the organization, with his personality and his dispositions of love, hate, fear, needs and aspirations.

The social systems theory is relevant to this study because Ukeje, Okorie and Nwagbara (1992:119) saw the school as a social system because it consists of a clearly defined population…students, teachers, the principals and other school personnel working to achieve the goals of the school and it is a system of social interactions comprising an interdependence of parts, among others. Edem (2006) added that an educational institution is a social system that has people who occupy positions of responsibility based on a hierarchical structure, their activities of which aim at bringing about learning.

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Workshop facilities, according to Udoh, Akpa and Gang (1997) and Olatunbosun (2005), refer to the school plant and include the site, buildings, tools, equipment, technical items and instructional materials. Castaldi (1994) explained that workshop facilities are the material things that facilitate teaching and learning, and include classrooms, workshops, instruments, tools and equipment. In this study, any materials – tools, equipment, workshop buildings, technical items and instructional materials – which aid teaching and learning in a practical way is a workshop facility.

Management of material resources in technical colleges is an important managerial function of technical college administrators. According to Datta (1992), facilities management is a management function which deals with the acquisition, control and use of materials in education. Viewed in relation to workshop facilities, the term management, according to Abbas, Yahaya and Muhammad (1997), means “promoting the lifespan of materials and equipment…which involves strategic planning, control and discipline by all the personnel concerned with the technical education” (p.34). Nwachukwu and Nwachukwu (2002) saw facilities management as the planning, organizing, procuring, coordinating, and control of facilities. Materials management involves purchase, distribution, storage and control and repair of facilities such as furniture, apparatus, equipment and other teaching materials (Udoh & Akpa, 2007). Consequently, facilities management in this study refers to the process of identifying, selecting, purchasing, distributing, storing, controlling and maintaining and repairing the facilities so as to improve their life span for effective teaching and learning.

Facilities in Nigerian schools are constantly breaking down due to poor maintenance management, non-availability of spare parts and the technical know-how to effect necessary repairs on them (Ukeje, Akabogu & Ndu, 1992). Sometimes, government purchased the facilities even when the workshops and laboratories to house them were yet to be erected (Dalha, 1996). In view of this, Udoh, Akpa and Gang (1997) observed that little attention is paid to management of equipment in schools and colleges across Nigeria. Consequently, as the facilities are ageing, they deteriorate at an alarming rate. In some cases, the facilities are either wasted away or vandalized and carted away (Adegbemiro, 2000; Mkpa, 2001). All this, according to Idriss, Ejikeme and Ijebor (2005), is due to negligence, corruption, government’s bad image and sabotage. There is therefore, the need to undertake maintenance management of the facilities.

Facilities maintenance management, according to Nubia (2000) refers to the systematic supporting service carried out on facilities to ensure their continuous use. Storm in Nubia stressed the need for routine maintenance practice which helps in providing a safe working environment. Routine maintenance covers aspects like general clean up, cleaning of lighting fixture, lubrication, minor servicing of equipment, and inspection. Therefore, the things to maintain and repair in workshops and laboratories, according to Nubia are leaking roofs and faulty engines, among others.

Dalha (1996:32) and Aghotor (1997:23), suggested the following ways for the preservation and maintenance of educational facilities in Nigerian institutions of learning: Acquisition of current equipment to avoid training students on obsolete ones, periodic replenishment of consumable materials, periodic machine maintenance, and provision of adequate security. Others are teachers and learners should take steps to develop useful teaching and learning materials for various schools, materials supplied by government must be preserved to guarantee protection from all forms of destruction and theft, and records of all instructional materials supplied to the school should be kept.These steps will go a long way in ensuring the safety of the facilities.

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Maintenance of facilities has been generally grouped into two, namely, preventive maintenance and corrective maintenance. In preventive maintenance, faulty equipment is detected early and repairs effected on them (Storm in Nubia, 2000; Jen, 2002). In preventive maintenance, according to Bature (2006), “repairs are made when deplorable facilities are in the incipient stage, thus preventing costly replacement and avoiding possible loss of valuable school time” (p.106).On the other hand, corrective maintenance, according to Usman(2007), is the type of maintenance that is not carried out at predetermined intervals, but rather after the equipment has been put to use and then breaks down.

According to Kochhar (2002), the management function of the technical school principal includes school plant management and equipment supply and management. In school plant management, Kochhar held that the principal has important responsibility in planning plant facilities, in equipping the facilities, in managing the utilization of the facilities and in administering the maintenance and operation of the facilities. Consequently, Kochhar argued that the principal needs to carry out the following school plant management functions: Periodically review the use of special rooms, prepare regular schedules for painting of equipment as well as maintenance, provide inventory of equipment, and inspection of equipment, among others (p.131).

Ibhadode (2001:17) advocated the following ways for the care of equipment and materials in technical colleges across Nigeria, namely, a well organized store should be manned by a skilled store keeper, an inventory of equipment and materials should be taken, inventory for capital items should be separate from that for small tools and consumables. Others are each piece of equipment should always be kept in good condition, machine tools and materials should be kept in their proper places, and scraps, including spoilt material, defective tools, chips…, should never be thrown away. Buttressing these points, Kochhar (2002) held that the facilities management duties of the school principal will involve appointing a facilities selection committee for purchase and maintenance, ensuring protection to the facilities, ensuring that proper record of equipment is kept and then knowing the latest trends in facilities designs. This will undoubtedly erase some of the flaws that are normally associated with facilities maintenance management in many schools.

**Methodology**

The study employed descriptive survey design which is a non-experimental research whereby a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. The area of the study is North-East Nigeria which consists of six States, namely, Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe State. The North-East lies between latitude 9o-14oE and longitude 11o-14oN (Abdullahi & Musa, 2004, Nigeria Latitude and Longitude, 2012). The North-East has a total of 33State-owned technical colleges (NABTEB, 2013).Descriptive survey research design was adopted where data were collected from 390 valid copies of a 16-item structured questionnaire, consisting of 75 administrators, 135 technical teachers and 180 students. The questionnaire was constructed by the researchers, based on existing literature, notably the management task areas of Gorton (1984), the major operational areas of educational management advocated by Campbell and Greggs in Mgbodile (1997), and the management principles of Urwick & Gulick (Edem, 2006). The items in the sections were treated on a five-point scale. Respondents were required to tick the option which best described their views on the items. The five-point scale treated the items in the sections as follows:

Very Effective (VE) - 5 points

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Effective (EF) - 4 points

Moderately Effective (ME) - 3 points

Ineffective (IE) - 2 points

Very Ineffective (VIE) - 1 point

Four experts in the field of Industrial Technology Education and Educational Management validated the instrument in terms of face and content validation. In order to obtain a reliable instrument, the validated copy was trial-tested on 20 respondents at the Government Technical College, Bukuru, Jos, Plateau State, Nigeria, made up of four administrators, four teachers and 12 students. The test re-test method of estimating reliability was used to collect data for the reliability of the instrument. There was an interval of two weeks between the first administration of the test and the second. The two tests had the same content and structure. The results of the two tests were correlated using the Statistical Package for Social Sciences (SPSS) version 17, to obtain the Pearson Product Moment Correlation Coefficient (rho), which was found to be 0.81.Mean () and standard deviation (б) were used to answer the research questions. The Statistical Package for Social Sciences (SPSS) version 17 was used to determine the mean and standard deviation, as well as the analysis of variance (ANOVA).

Table 1 shows the true limits of real numbers for the five-point scale and their designations.

Table 1: True Limits of Real Numbers

|  |  |
| --- | --- |
| Limits | Designation |
| 4.50 – 5.00 | Very Effective (VE) |
| 3.50 – 4.49 | Effective (EF) |
| 2.50 – 3.49 | Moderately Effective (ME) |
| 1.50 – 2.49 | Ineffective (IE) |
| 0.50 – 1.49 | Very Ineffective(VIE) |

To effect decision, a mean () of 3.50 and above was considered “effective” and a mean of less than 2.50 was considered “ineffective”. From the table, mean scores that ranged between of 2.50 and 3.49 were considered “moderately effective”. The decision rule for the F-ratio was: reject the null hypothesis if the calculated F-ratio exceeds the critical F-ratio; otherwise do not reject the null hypothesis if the calculated value of the test statistic is less than the critical value.

**Presentation of Results**

The results of the study are presented based on the research question and hypothesis.

**Research Question**

What are the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria?

Data that answered this research question are presented in Table 2.

**Table 2:** Mean and Standard Deviation of Responses of Administrators, Teachers and Students on the Initiatives Required from Administrators on the Effective Management of Facilities in Technical Colleges in North-East Nigeria.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Administrators  nA=75 | | Tech. Teachers  nT=135 | | Students  nS=180 | | Grand Mean |  |
| S/N | Items | A | бA | T | бT | S | БS | G | Remarks |
| 1 | A budget for facilities maintenance management | 3.92 | 1.06 | 3.56 | 1.43 | 3.34 | 1.50 | 3.53 | Effective |
| 2  ***Manabete, Onuh & Kwami*** | A planned facilities maintenance management schedule | 3.80 | 1.23 | 3.42 | 1.30 | 3.27 | 1.53 | 3.42 | Mod. Effect. |
| 3 | Setting up of a facilities management team | 3.96 | 1.17 | 3.74 | 1.30 | 3.01 | 1.07 | 3.44 | Mod. Effect. |
| 4 | A facilities procurement committee in place | 3.28 | 1.39 | 2.91 | 1.29 | 2.57 | 1.10 | 2.87 | Mod. Effect. |
| 5 | A systematic method of facilities receipt | 3.91 | 1.15 | 3.68 | 1.27 | 3.14 | 1.44 | 3.47 | Mod. Effect. |
| 6 | Inspection of facilities supplied to ensure quality | 3.69 | 1.36 | 3.44 | 1.32 | 3.18 | 1.44 | 3.36 | Mod. Effect. |
| 7 | Inventory of all facilities | 3.45 | 1.31 | 3.36 | 1.19 | 2.89 | 0.90 | 3.16 | Mod. Effect. |
| 8 | An up-to-date facilities storage system | 3.99 | 1.07 | 3.29 | 1.34 | 2.24 | 1.34 | 2.94 | Mod. Effect. |
| 9 | Separating facilities based on their characteristics to avoid damage | 3.15 | 1.50 | 3.65 | 1.29 | 3.23 | 1.36 | 3.36 | Mod. Effect. |
| 10 | Prompt installation of purchased equipment | 3.84 | 1.17 | 3.90 | 1.16 | 3.43 | 1.01 | 3.67 | Effective |
| 11 | A systematic method of facilities issuance | 3.89 | 1.19 | 3.47 | 1.48 | 3.36 | 1.17 | 3.50 | Effective |
| 12 | Preventive maintenance method in place | 3.43 | 1.25 | 2.58 | 1.36 | 2.97 | 1.44 | 2.92 | Mod. Effect. |
| 13 | Prompt repair of damaged facilities | 3.68 | 1.44 | 2.80 | 1.43 | 3.32 | 1.16 | 3.21 | Mod. Effect. |
| 14 | Facilities workshop safety methods in place | 3.25 | 1.43 | 2.76 | 1.42 | 2.73 | 1.32 | 2.84 | Mod. Effect. |
| 15 | A team of watchmen who guard facilities | 3.25 | 1.39 | 3.27 | 2.87 | 3.01 | 1.21 | 3.15 | Mod. Effect. |
| 16 | Supervision of facilities maintenance programme | 3.16 | 1.56 | 2.76 | 1.29 | 3.02 | 1.25 | 2.95 | Mod. Effect. |

Grand Mean 3.39 3.44 3.10 3.24 M.E.

KEY

nA = Sample for administrators

nT = Sample for teachers

nS = Sample for students

A = Meanscore of administrators

бA = Standard deviation of administrators

T = Mean score of technical teachers

бT = Standard deviation of teachers

S = Mean score of students

бS = Standard deviation of students

G = Grand mean of the three respondents

Mod. Effect. = Moderately Effective

The grand mean scores of the items in Table 2 ranged between 2.84 and 3.67. The standard deviation of the mean scores of the responses of the respondents ranged between 0.90 and 2.87. Out of the 16 items in the table, only three items have been rated effective by respondents. The items are 1, 10 and 11. The remaining 13 items were rated moderately effective by respondents. They are items 2, 3, 4, 6, 7, 8, 9, 12, 13, 14, 15 and 16. The overall grand mean of the table is 3.24. This result shows that the initiatives required from administrators on the management of facilities in technical colleges in North-East Nigeria are moderately effective.

**Test of Hypothesis**

There is no significant difference in the mean scores of administrators, teachers and students on the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria

Data that tested this hypothesis are presented in Table 3.

**Table 3:** Analysis of Variance (ANOVA) Test for Comparing the Mean Scores of Responses of Administrators, Teachers and Students on the Initiatives Required from Administrators on the Effective Management of Facilities in Technical Colleges in North-East Nigeria

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|  |
| --- |
| Sources of df Sum of Mean F-cal F-critical Significance Decision  Variation Squares Squares |
| Between  Means 2 1.04 0.52  4.09 3.22 S Reject  Within  Means 42 5.35 0.13 |
| TOTAL 44 6.39 |

In Table 3, testing at degrees of freedom (df) 2 and 42 and level of significance 0.05, the result shows that the calculated F value (F-cal) is 4.09 as while the critical value (F-crit) is 3.22. Since F-cal is more than F-crit, it means that there is a significant difference in the mean scores of the responses of administrators, technical teachers and students on the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria. Therefore, the null hypothesis, Ho, is rejected. A post hoc Scheffe test however, establishes the respondent group that creates the significant difference in the mean scores of the respondents. The result is presented in Table 4.

Table 4: Scheffe’s Pair-wise Comparison on the Mean Scores of Responses of Administrators, Teachers and Students on the Initiatives Required from Administrators on the Effective Management of Facilities in Technical Colleges in North-East Nigeria

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pairing type | Df | Fs | Fcrit | Result |
| Admin vs Tech. teachers | 2 | 0.071 | 3.21 | Fs1 ˂ Fcrit |
| Admin vs Students | 2 | 2.33 | 3.21 | Fs2 ˂ Fcrit |
| Tech. teachers vs Students | 2 | 3.31 | 3.21 | Fs3 ˃ Fcrit |

The result of Table 4 shows that no significant difference exists between the mean scores of the responses of administrators and teachers and between administrators and students as their Scheffe values of 0.071 and 2.33 respectively, have not exceeded the critical value (Fcrit) of 3.21. But a significant difference in mean scores exists between technical teachers and students as their Scheffe value of 3.31 has exceeded the Fcrit value. Therefore, students are the respondent group that is responsible for creating the significant difference in the mean scores of the responses of administrators, technical teachers and students on the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria

**Findings of the Study**

1. Only three workshop facilities management initiatives were found to be effective. They are a budget for facilities maintenance management, prompt installation of purchased equipment, and a systematic method for facilities issuance.
2. Workshop facilities management initiatives found to be moderately effective are setting up of a facilities procurement committee, inspection of facilities supplied to ensure quality, inventory of all facilities and an up-to-date facilities storage system, preventive maintenance method in place, prompt repair of damaged facilities and a team of watchmen guarding the facilities, among others.
3. On the whole, workshop facilities management initiatives required from technical college administrators in technical colleges in the North-East of Nigeria were moderately effective.
4. There was a significant difference in the mean scores of administrators, teachers and students on the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria. The result of the Scheffe post hoc test revealed that students were responsible for creating the significant difference in the mean scores of the respondents.

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**Discussion of Findings**

The study found the following workshop facilities management initiatives effective: a budget for facilities maintenance management, prompt installation of purchased equipment, and a systematic method for facilities issuance. The finding disagrees with Dalha (1996) who said that purchased facilities more often than not were not installed promptly but left to rot in government premises. Setting up a facilities maintenance management team which is found to be effective agrees with Kochhar (2002). The finding on the budget for facilities maintenance agrees with Kochhar (2002) and Okoro (2006) who saw the budget as an effective means of workshop facilities management.

The study found the following workshop facilities management initiatives moderately effective: setting up a facilities procurement committee, inspection of facilities supplied to ensure quality, an up-to-date facilities storage system, preventive maintenance method in place, prompt repair of damaged facilities and watchmen who guard workshop facilities. This finding falls short of the suggestion by Jen (2002) and Bature (2006) who argued that preventive maintenance practice needs to be adopted in facilities maintenance management. Bature (2006) explained that preventive maintenance is necessary because repairs are carried out well ahead which prevents costly replacements and loss of valuable time. The study also falls short of the suggestion by Aghotor (1997) who said that facilities need to be provided with adequate security to prevent theft and vandalization. According to Kochhar (2002), effective workshop facilities management practices are inspection of facilities and selection of a purchase committee. However, the study found these initiatives to be only moderately effective.

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The finding of the study showed that a significant difference existed in the mean scores of administrators, teachers and students on the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria. A Scheffe post hoc multiple comparison revealed that students were responsible for creating the significant difference. This finding is opposed by Manabete (2010) whose work did not establish any significant difference in the mean scores of teachers, workshop attendants and students on workshop facilities utilization and management. The finding is also opposed by the work of Umar and Ma’aji (2010) in which no significant difference exited in the mean scores of administrators, teachers and workshop personnel on workshop facilities adequacy and utilization in technical college workshops in North Central Nigeria.

**Conclusion**

The way and manner workshop facilities are managed in technical colleges is of very serious concern. Consequently, the study set out to examine the initiatives required from administrators on the effective management of facilities in technical colleges in North-East Nigeria. The study found that facilities management initiatives by administrators were moderately effective. This finding demonstrated the way and manner learning facilities and other infrastructure have been handled in the technical colleges. Consequently, the study recommended that administrators of the technical colleges needed to improve on their initiatives in managing facilities in the technical colleges towards effectiveness, notably in such areas as setting up a facilities procurement committee, taking inventory of all facilities, putting in place a preventive maintenance method, and supervision of facilities maintenance programme.

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**EDUCATION AND TRAINING REQUIREMENTS OF LECTURERS WHO TEACH FINANCIAL ACCOUNTING IN TERTIARY INSTITUTIONS IN ADAMAWA STATE, NIGERIA.**

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**Abstract**

*The study determined accounting qualifications required by lecturers for effectively teaching financial accounting in tertiary institutions in Adamawa state, Nigeria. The descriptive survey method was used for the study, and the whole population of 87 accounting lecturers in the tertiary institutions was used for the study, for being manageable. It was a census, as there was no sampling. The instrument was Educational Qualification Required for Teaching Accounting in Tertiary Institutions Questionnaire (EQRTATIQ). It was duly validated and Cronbach Alpha coefficient was used to determine the level of reliability, with the test yielding a reliability coefficient of 0.92. The mean and standard deviation were used to analyze the research question while ANOVA was used to test the hypothesis at probability level of 0.05. It was found that majority of the accounting and accounting related qualifications were accepted as those required for teaching in the tertiary institutions. Recommendations included persons desirous of being accounting lecturers in the institutions painstakingly acquiring the required qualifications and the lecturers ensuring they have computer software utilization competencies, among others.*

**Keywords:** Accounting Qualifications, Lecturers, and Tertiary Institutions.

**Introduction**

Education is the aggregate of all the processes by which a child or young adult develops the abilities, attitudes and other forms of behaviour .which are of positive value to the society in which he lives. Fafunwa, in Nnachi(2008), stated that it is a process for transmitting culture, in terms of continuity and growth and for disseminating knowledge, either to ensure social control or to guarantee rational direction of the society or both. Similarly,

In the same vein, Adebola (2002) observed that education is not an end in itself, but a means to an end, adding that such education is only relevant when it provides adequate and timely information to achieve desired objectives. Adebola further stated that education, without some measure of information technology knowledge, is grossly deficient. This, he observed, is because of the growing number of jobs that require some measures of information literacy, while familiarity with words like dot.com, e-commerce, e-mail, and internet are assumed in many organizations. Rapid changes and uncertainty in the work place encourage employers to seek workers who have already acquired the necessary modern skills (Adebola, 2002).

According to Sunda (2007), the job of a tertiary lecturer is open to all graduates; first class or upper second class and doctoral degrees relevant to the posts are required, along with:

1. Demonstrable experience of (or clear potential for) teaching.
2. The ability to produce original research for peers.
3. Early publication of academic work.

Sunda further stated that entry into the job of tertiary lecturer, without a degree is not possible, entry without a Ph.D is difficult, adding, however, that for more vocational or specialized courses, expertise in those fields may just be as valuable as a Ph.D. Sunda (2007) added that candidates will need to show evidence of the following, in addition to 1 - 3 above.

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These are ability to sustain an interest in, and enthusiasm for their areas of specialist research and impart this to students and peers, capacity for original thought, expertise in their subject areas, the potential to expand their knowledge to be able to teach a broad curriculum and confidence in dealing with a wide range of people. Others are the ability to work both independently and as part of a team, excellent analytical skills, commitment to the profession and their own continuing professional development (CPD), a flexible approach to work and good information and communication technology (ICT) skills.

Sundar also stated that most tertiary institutions offer a wide range of in house training for their staff. These cover research techniques, administration, management, skills, personal development and information and communication technology (ICT) skills.

Universities also support staff who wish to undertake training courses, outside their own institutions, if such courses are directly related to their work (Sunda, 2007). In the same vein, (Higher Education Academy (2010) stated: "to become a higher education lecturer, you would normally need a first class or upper second class first degree and postgraduate qualification related to the subject you wish to teach". HEA (2010) added that this is usually a Ph.D, but one may be accepted if one is working towards a Ph.D or has a Master's degree, such as MA or M.Sc. HEA further stated that lecturers teaching vocational courses, such as accounting and hotel and catering management often have professional, rather than academic qualifications. In addition, HEA advised: "as a University lecturer, you should have extensive knowledge of your subject, keep up-to-date with new ideas and developments in your subject, have excellent spoken and written communication skills, and have the confidence to lecture to large groups".

In the efforts to further educate the accounting lecturer, 'Osuala (2009) provided general guides to lecturers of Accounting, where financial accounting is a major component. Osuala stated that the following points are suggested as general guides to lecturers of accounting for effective teaching and learning in the class:

1. The lecturer should have a sound academic background in accounting to be able to impart knowledge adequately.
2. The lecturer should know the domains of educational objectives to be able to formulate instructional objectives, using:
3. Appropriate action verbs.
4. Specifying the time for achievement of the objective.
5. Stating the level of minimum performance of the students.
6. Stating the operational condition.
7. Stating the behaviour terms, that is, the expected outcome of the lesson (visible, overt, measurable and quantifiable).
8. The accounting lecturer should be knowledgeable in the approaches and methodologies of teaching accounting and should be able to select them appropriately.
9. He should encourage his students to engage in repeated actual practice and drill in the subject to be able to acquire the required skills.
10. The accounting lecturer should introduce his subjects to new students in a manner that will:

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1. Make the students interested in the subject.
2. Build confidence and ability to understand and succeed in the students. Make the students understand that the lecturer has personal interest and concern for them to succeed in the subject.
3. The lecturer should ensure that the environment is comfortable for learning; fresh air, good lighting, furniture conveniently arranged, thereby minimizing possible distractions.
4. The lecturer should be able to communicate very well. He should be able to speak the language of the subject, but his vocabulary should be adjusted to the students' level.
5. The accounting lecturer should not only appreciate the usefulness of the computer in data processing but should be able to apply his knowledge of the computer and other electronic information techniques such as the internet, electronic mail (e-mail).etc to teach his students. This will update the lecturer and the students in business information technology.

It follows from the positions presented above that those lecturers who would be required to teach financial accounting in the tertiary institutions need proper training in computer software utilization in the delivery process, in addition to the accounting educational and professional qualifications to perform creditably.

In line with the position above, Nwanewezi and lsifeh- Okpokwu (2008) observed that the use of ICT in acquiring knowledge and skill has become an essential element ineducation and training, adding that the ICT elements in the educational process have magical effects. They further observed that higher education, without the support of ICT, makes the lives of lecturers and students equally difficult.

Nwanewezi and Isifeh-Okpokwu (2008) further observed that availability and utilization of ICT in the teaching and learning process have generated serious concerns recently. They stated that despite the numerous contributions of ICT in the teaching and learning process, it is not available in several institutions for the teaching and learning of financial accounting, adding that some lecturers of accounting have not appreciated its importance in the delivery process. Other lecturers, they further stated, think themselves incompetent to handle IC'I' as instructional delivery tool.

In the same vein, Aduwa-Ogiegbaen and Iyamu (2005) stated that the role of technology in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy. Most experts in the field of education, they observed, agreed that when properly used, information and communication technology holds great promise to improve teaching and learning, in addition to shaping work-force opportunities. However, they further observed that computer illiteracy among lecturers, including those teaching accounting, is now regarded as the new illiteracy. This has actually gingered a new and strong desire to equip institutions with computer facilities and qualified personnel necessary to produce technologicallyproficient and efficient graduates in the developed countries of the world (Aduwa-Ogiegbaen and Iyamu, 2005).

According to Aduwa-Ogiegbaen and Iyamu (2005), Nigeria needs to replace the traditional pedagogical practices that still underpin its educational system. They further stated that in a report of the World Bank sponsored research on the state of the Nigerian graduate, Dabalen and Oni (2001) asserted that Nigerian University graduates of the past decade were poorly trained and unproductive on the job. The report, they observed, indicted Nigerian University graduates as deficient in mastery of the English Language and requisite technical skills, including ICT skills. Such development calls for a rethinking of the objectives education should pursue (Aduwa- Ogiegbaen and Iyamu, 2005).

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**Statement of the Problem**

The teaching of accounting in tertiary institutions needs to be done by lecturers who have a thorough knowledge of the subject, both in theory and practice. This is because graduates of the course from tertiary institutions are those expected to educate others at the lower levels of education requiring the subject and practitioners in the industry. Also, accounting education, meeting modern practice requires the knowledge of ICT, to a reasonable extent. However, it is not all the lecturers of accounting in tertiary institutions that have the pedagogy (methodology of teaching) to be able to teach the students satisfactorily. Also, some of the lecturers do not have ICT literacy enough to integrate it into their accounting delivery, hence the need for this study.

**Methodology**

The study was a descriptive survey design, and Adamawa state, Nigeria was the area of study. The study was on Universities, Polytechnics and Colleges of Education in the study area. The population for the study was all the 87 accounting lecturers in the tertiary institutions that are in the state. The whole of the population was studied, for it being manageable; so it was a census. The instrument for the study was a Five Points Likert scale questionnaire, duly validated and had a reliability coefficient of 0.94. The instrument had the following response categories.

Strongly Agreed (SA) 5 points

Agreed (A) 4 points

Undecided (UD) 3 points

Disagreed (D) 2 points

Strongly Disagreed (SD) 1 point

Copies of the questionnaire were distributed by the researcher and three research assistants. They were collected by the researcher and the assistants after completion by the respondents. Data was analyzed, using the Mean and Standard Deviation while the null hypothesis was tested, using ANOVA.

The decision rule for the research question was based on the normal values assigned to the different scale items of the questionnaire and the corresponding mean values were interpreted, using real limits of the means. Thus, any item that had a mean of 2.50 or above was interpreted as agreed, while any item with mean below 2.50 was interpreted as disagreed.

**Research Question**

What are the education and professional qualification requirements of the lecturers who teach financial accounting in the tertiary institutions?

**Results**

In the efforts to answer the research question, accounting and accounting related qualifications were presented to the respondents for their responses. Their responses were analyzed in Table 1.

**Table 1:** Education Qualification Requirements of Lecturers Teaching Accounting in Tertiary Institutions in the North-East, Nigeria.

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|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Item/Statements** | **Universities** | | | **Polytechnics** | | | **Colleges of Education** | | |
| **X** | **SD** | **RMK** | **X** | **SD** | **RMK** | **X** | **SD** | **RMK** |
| B.Sc Accounting | 3.92 | 1.89 | A | 4.20 | 0.90 | A | 2.78 | 0.97 | A |
| B.Sc Bus Education (Accounting) | 2.92 | 1.26 | A | 4.20 | 1.14 | A | 3.44 | 0.88 | A |
| M.Sc. Accounting | 4.54 | 0.52 | A | 4.10 | 1.00 | A | 4.00 | 0.00 | A |
| M.Sc Bus Education (Accounting) | 3.40 | 1.61 | A | 3.23 | 1.20 | A | 4.56 | 0.53 | A |
| PhD Accounting | 4.15 | 1.21 | A | 3.92 | 1.04 | A | 4.67 | 0.50 | A |
| Ph.D Bus Education (Accounting) | 3.70 | 1.32 | A | 3.23 | 1.48 | A | 4.56 | 0.73 | A |
| Associate Chattered Accountant, with MBA in Accounting. | 3.54 | 1.27 | A | 3.62 | 1.26 | A | 4.44 | 0.53 | A |
| M.A Commerce | 2.00 | 0.71 | D | 2.85 | 1.02 | A | 2.56 | 0.53 | A |
| HND Accounting | 2.31 | 0.95 | D | 3.62 | 1.20 | A | 2.33 | 0.50 | D |
| HND Bus. Administration. | 2.10 | 0.90 | D | 2.15 | 1.28 | D | 2.33 | 0.71 | D |
| MBA Accounting. | 2.54 | 0.90 | A | 2.92 | 1.38 | A | 3.44 | 0.88 | A |
| B.Sc. Accounting with PGD (Education). | 3.54 | 0.97 | A | 3.77 | 1.17 | A | 4.00 | 0.00 | A |
| M.Sc Accounting, with PGD (Education). | 3.62 | 1.33 | A | 3.85 | 1.87 | A | 3.67 | 0.50 | A |
| Ph.D Accounting, with PGD (Education) | 3.70 | 1.25 | A | 3.35 | 1.07 | A | 3.67 | 0.50 | A |

The results presented in Table 1 showed that item 8 (M.A Commerce) was accepted by lecturers in polytechnics and Colleges of Education, but disagreed by University lecturers as qualification required for teaching Accounting in the tertiary institutions. Item 9 (HND. Accounting) was accepted by Polytechnic lecturers, only, but was disagreed by university and Colleges of Education lecturers, as required qualification for teaching accounting in the tertiary institutions. The position of the polytechnic lecturers regarding the qualification can be better understood from the fact of their being the producers of holders of the qualification and a reasonable number of them being holders of the qualification. However, all the lecturers of the tertiary institutions disagreed on item 10 (HND Business administration) being a required qualification for teaching accounting in the tertiary institutions.

As regards items 1 to 7 and 11 to 14, all the lecturers in the identified tertiary institutions agreed that they were qualifications required by lecturers in the institutions for teaching accounting.

**Research Question 2:** What are the Computer Software Utilization Training requirements of Lecturers teaching Financial Accounting in Adamawa State Tertiary Institutions?

Table 2 below Contains responses to the research question above.

**Table 2:** Mean Responses and Standard Deviation of Accounting Lecturers on Computer Software Utilization Training by Lecturers Teaching Financial Accounting in Adamawa State Tertiary Institutions.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **tem/Statements**  ***Emmanuel A Adukwu*** | **Universities** | | | **Polytechnics** | | | **Colleges of Education** | | |
| **X** | **SD** | **RMK** | **X** | **SD** | **RMK** | **X** | **SD** | **RMK** |
| Word Processing. | 4.23 | 0.60 | A | 4.31 | 0.75 | A | 4.33 | 0.50 | A |
| Spreadsheet. | 4.40 | 0.51 | A | 4.23 | 0.73 | A | 4.44 | 0.53 | A |
| Database Management | 4.08 | 0.80 | A | 4.15 | 0.80 | A | 4.33 | 0.50 | A |
| Integrated software. | 4.08 | 0.90 | A | 3.77 | 0.93 | A | 4.44 | 0.53 | A |
| Graphics | 3.70 | 0.90 | A | 3.31 | 1.03 | A | 4.56 | 0.53 | A |
| Power-point presentation. | 4.31 | 0.80 | A | 3.85 | 0.80 | A | 4.44 | 0.53 | A |
| Desktop publishing. | 3.80 | 1.10 | A | 3.38 | 1.03 | A | 4.67 | 0.50 | A |
| Authoring Software. | 3.80 | 0.93 | A | 3.23 | 1.17 | A | 4.67 | 0.50 | A |
| Multimedia | 3.70 | 0.90 | A | 3.39 | 1.19 | A | 4.61 | 0.50 | A |
| CD ROM | 3.92 | 0.80 | A | 3.31 | 0.90 | A | 4.22 | 0.44 | A |
| The Internet. | 4.31 | 0.90 | A | 4.00 | 0.91 | A | 4.33 | 0.50 | A |
| Electronic Mail. | 4.08 | 0.80 | A | 3.46 | 1.05 | A | 4.56 | 0.53 | A |
| Commercial online Service. | 4.08 | 0.70 | A | 3.46 | 0.88 | A | 4.44 | 0.67 | A |
| Electronic Bulletin Boards. | 4.20 | 0.90 | A | 3.54 | 0.88 | A | 4.44 | 0.73 | A |
| Drill and Practice tutorials. | 3.90 | 0.90 | A | 3.77 | 0.93 | A | 4.22 | 0.67 | A |
| Discipline Specific Programmes. Peachtree 1st Accounting, DAC Easy, SAGE, Pacioli 2000. | 3.90. | 1.30 | A | 3.62 | 1.26 | A | 4.11 | 0.60 | A |
| Computer Managed Learning (CML). | 3.54 | 1.30 | A | 3.77 | 0.93 | A | 4.22 | 0.67 | A |
| Computer Based Assignment (CBA). | 3.92 | 0.80 | A | 3.77 | 0.93 | A | 4.22 | 0.67. | A |

Similarly, all the lecturers in the institutions agreed that items 15 to 32 (Training in computer software utilization) were required by the lecturers for successful teaching of accounting in the tertiary institutions.

**Hypothesis**

There is no significant difference in the mean responses of accounting lecturers on the qualifications required for teaching accounting in the tertiary institutions.

**Table 3: Test of Hypothesis**

|  |
| --- |
| **Source of variation** |
| **Some of square** | **Df** | **Mean square** | **F-Cal** | **F crit.** | **Decision** |
| Between groups | 4.260074 | 2 | 2.13007 | 5.870089 | 3.094337 | Reject |
| Within Groups | 33.74624 | 93 | 0.362863 |  |  |  |
| **Total** | 38.00632 | 95 |  |  |  |  |

The analysis of variance (ANOVA) presented in Table 2 showed that F-calculated (f-cal) of 5.870089 was greater than the f-critical (f-tab of 3.094337), at P.value of 0.00397. This indicated that there was significant difference in the mean responses of the accounting lecturers in the tertiary institutions on the accounting qualifications required for teaching accounting in the tertiary institutions. The post-hoc analysis (multiple comparison) further indicated that significant difference existed among the three groups of respondents. The Null hypothesis of no significant difference is, therefore, rejected.

**Finding of the Study**

It was found, from the analysis, that majority of the qualifications listed in Table 1, above, were accepted as qualifications required to be possessed by accounting lecturers for teaching accounting in the tertiary institutions. It was also found that M.A. Commerce was accepted by polytechnic and Colleges of Education lecturers, only, as required qualification for teaching accounting and only polytechnic lecturers accepted HND Accounting as required qualification for teaching accounting in the tertiary institutions. Another finding is that all the lecturers agreed that training in computer software utilization is a requirement for successful teaching of Financial Accounting in the Tertiary Institutions.

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**Discussion of Results**

Analysis of the research revealed agreement by the respondents (accounting lecturers) that majority of the items (accounting qualifications) were required by the lecturers for teaching accounting in the tertiary institutions. However, the test of hypothesis indicated that significant difference existed in the mean responses of the accounting lecturers. The Post Hoc analysis (multiple comparison) also revealed that significant difference existed among the various groups of respondents. The variety of accounting qualifications held by the respondents and difference in the groups of institutions could be adduced for the observed differences.

The accounting lecturers also agreed that accounting lecturers, for them to teach the subject effectively, required training in computer software utilization. This position is supported by Nwanwezi and Isife-Okpokwu (2008) who observed that the use of ICT in acquiring knowledge and skills has become an essential element in education and training, adding that the ICT elements in the education process have magical effects.

**Conclusion**

The conclusion drawn from the study is that accounting lecturers in the tertiary institutions require majority of the accounting qualifications presented for the study. They also require training in computer software utilization to perform creditably.

**Recommendations**

Based on the findings of the study, the recommendations include: Those who would want to be accounting lecturers of repute in the tertiary institutions should endeavour to painstakingly acquire the relevant accounting qualifications required by the institutions.

The lecturers should embrace ICT effectively to be able to integrate computer software utilization in their accounting education delivery with success. Apart from acquiring the accounting and computer software utilization knowledge, it is desirous for the accounting lecturers to become knowledgeable in pedagogy (methodology of teaching accounting) for them to able to impart the accounting knowledge better than now. The NUC, NBTE and NCCE, the regulatory agencies of the institutions where the lecturers teach can be in the fore-front of ensuring implementation of this laudable proposal.

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**ENTREPRENEURIAL SKILLS IMPROVEMENT NEEDS OF SMALL-SCALE FARMERS IN FEEDING FISH AND FISH HEALTH CARE MANAGEMENT IN TARABA STATE, NIGERIA.**

**BY**

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**Abstract**

*The study determined entrepreneurial skills improvement needs of small-scale fish farmers in Taraba State. Two objectives translated into two research questions guided the study. The study adopted descriptive survey research design. The population for the study was 460 comprising of 400, small scale fish farmers and 60 extension agents. The sample size is 260 respondents. Using proportionate stratified simple random sampling, 200 fish farmers were chosen to participate in the study while purposive sampling technique was used to include the entire extension worker in this study. A 19 items skills questionnaire titled “entrepreneurial skill improvement needs of fish farmers questionnaire (ESINFQ) which had four point rating scale was employed. Three expert faces validated the questionnaire. The reliability co-efficient of the instrument was computed using cronbach Alpha method which yielded co-efficient of 0.085. The research questions posed were answered using weighted mean and improvement needed index (INI). Finding revealed that small scale fish farmers needs entrepreneurial skills in all the nine items on feeding fish and 10 entrepreneurial skills on fish health care management identified by the study. Based on these findings, it was recommended that training programmes in form of workshop, seminar and short duration courses could be organized by extension agents for small scale fish farmers to improve their skills in fish feeding and healthcare management.*

**Keyword:** Entrepreneurship, Skills, Improvement, Small scale fish farmers.

**Introduction**

Good nutrition in fish production system is essential to economically produce a healthy, fast growing and high quality fish. In fish farming, nutrition is critical because feeds represent 60-70% production cost. Fish nutrition has advanced dramatically in recent years with the development of new balanced commercial diet that promote optimal fish growth and health. In rearing fish, nothing is more important than a well balance diet and adequate feeding to achieve good growth and high profit margin. Successful fish farming therefore demands that the farmer have a good knowledge and appreciation of nutrition, feeds and feeding practices mixture of feed stuffs, blended or processed in a form that is acceptable to fishes. The feed must meet the nutrient requirement of the species in terms of protein (balanced amino acid profile), energy vitamins and minerals. Jamu and Ayinla (2003) further posits that a newly hatched fry 5-7mm in size and 1.2-3.0mg in weight do not have to be feed as they rely in the food resources within their yolk-sac for the first few days. Within 2-3 days after hatching (48 hours at 280c), the yolk sac is absorbed and the hatching is visibly developed into small fishes and start to search for food. At this stage, the fry must be feed on external feed, for its further development and survival. At this stage fry need to be fed a high protein diet frequently and usually in excess. According to Jamu and Ayinla (2003), many factors affect the feeding rates of fish. These include time of the day, season, water temperature, dissolved oxygen levels, and other water quality variable.

Disease condition effects productivity in fish farming enterprise because it can lead to wastage of feeds and maturity. Akin (2000) describes fish disease as any deviation of the body from its normal or healthy state causing discomfort, in convenience or even death of the fish. Stress plays a vital role in susceptibility of fish to disease or weakens the immunity of the fish. Physical signs of disease condition in fish culture according to Iwena (2002) include, discoloration of part of skin, eruded (atrophy) parts of the fin, tail, protruded eyes (exophthalmia), swollen belly due to accumulation of the fluid (abdominal dropsy), cyst of parasite or tumors on the body part among others. Internally, the liver/kidney become pale, hemorrhages in organs, lesion on organs. Behavioural signs of disease are loss of appetite, weakness or loss of vitality, lack of response to fright stimuli, vertical upward hanging, flashing or scratching of body against culture tank, whirling movement and loss if equilibrium. Iwena (2002) enumerated two types of treatment in fish disease. These are prophylactic and therapeutic. Prophylactics are preventive measures designed to prevent out break from accruing and the treatment are usually against ectoparasites and stress while therapeutic treatments are carried out only after signs of disease appear and are curative in nature. The author further opined that fish farmer must have adequate understanding of the sources of water, the drugs and the disease before commencement of any treatment.

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The overall objectives of the small-scale fish farming are to produce maximum weight of marketable fish from a given volume of water in shortest time at a least-cost (Papka, 2001). This can only be achieved if the small-scale fish farmer possesses adequate entrepreneurial skills in fish farming operation.

Entrepreneurial, in the view of Meredith, Nelson and Neck (1990), means combining personal characteristics, financial means and resources within one’s environment. Sett (2004), described being entrepreneurial as having quality business vision, opportunity, mission, strategies and resources. In the context of this study, entrepreneurial means the ability of the small scale fish farmers to find an opportunity and gather the necessary resources to invest in small-scale fish farming in which they are interested and skilled.

Skills in the view of Ibrahim (2007), is a specified ability to do something well. Ejiofor (2010) explained skills as well established habit of doing things by people. Onu and Ugwuoke (2009) speculated that one who lacks skill may not be useful to himself and the society. This implies that small scale farmers who lack entrepreneurial skill in fish farming may not be able to establish the business, let alone sustaining it hence, the justification for this study.

**Objectives of the Study**

The purpose of this study is to determine entrepreneurial skill improvement needs of small-scale fish farmer in Taraba State, specifically, the study sought to identify:

1. Entrepreneurial skills improvement needs of small scale fish farmers in feeding fish.
2. Entrepreneurial skills improvement need of small scale fish farmers in fish health care management.

**Research Questions**

The following research question guided the study,

1. What is the entrepreneurial skills improvement need of small-scale fish farmers in feeding fish?
2. What are the entrepreneurial skill improvement needs of small fish farmers in fish health care management?

**Methodology**

The study adopted descriptive survey research design. According to Robert (2000) survey research design involves eliciting information from the respondents about their feeling, opinions and views on a phenomena. Descriptive survey research design is suitable for this study since it made use of the questionnaire to collect data from small-scale fish farmer and agricultural extension agent on the entrepreneurial skill improvement needs of small-scale fish farmer in Taraba State.

The study was carried out in Taraba State which comprises othree agricultural zone: zone a, zone b, and zone c; the population for the study was 460 made up of 400 small-scale fish farmers and 60 extension agents in the three agricultural zone of Taraba State (TADP 2011). The samples for the study was 260 respondents consisting of 200 small-scale fish farmers and 60 extension agents. (All the 60 extension agents were used). Proportionate stratified random sampling technique was used to select the sample for small-scale fish farmers while entire extension agent was used because it is small and manageable.

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The instrument used for data collection was a 19 items questionnaire which had four points rating scale generated from review of literature. The questionnaire was divided into two parts. Part a was used to obtain information on personal data of the respondent while part B was used to elicit information on entrepreneurial skills improvement need of small-scale fish farmers Part B has two components of improvement and performance. The needed component has 4 point response option of Highly Needed (HN), Averagely Needed (AN), Slightly Needed (SN), and Not Needed (NN) while the performance component has four point response option of High Performance, (HP), Average Performance (AP), Low Performance (LP) and No Performance (NP). Agriculture extension agent’s respondents to the needed component while small-scale fish farmers responded to the needed and the performance component.

The instrument was validated by three experts, two from Agriculture Education Department and one from Department of Fisheries and Agriculture of Federal University of Agriculture Makurdi. The experts were requested to restructure, correct and eliminate irrelevant item. The contributions of the experts were used to develop the final copy of the questionnaire. The cronbach Alpha method was used to determine internal consistency of the instrument and the coefficient of 0.85 was obtained. Three (3) research assistance helped to administer the instruments to the small-scale fish farmer and extension agent in the (3) agricultural zone in Taraba State. They were instructed on how to administer the questionnaire to respondents and how to assist the small-scale fish farmer where they have difficulty to interpret the language of the questionnaire. Two hundred and sixty copies of the questionnaire were administered to the respondent and retrieve through the research assistant.

The data collected was analyzed using weighted mean and Improvement Needed Index (INI) to answer the research question. Decision making on improvement needed index was determine as follow: -

1. The mean (Xn) for the needed category was calculated.
2. The mean (Xp) for the performance category was calculated.
3. The difference between ((Xn) and (Xp) for each item was calculated to obtain the need value (NGV) i.e (Xn)-(Xp) – NGV
4. If NGV value is zero (0) there is no need for improvement on that item because the level for needed for that item is equal to the level of performance of that item by the small-scale fish farmers.
5. If NGV value is positive (+), improvement is needed on that item because the level of needs for that item is higher than the level of performance of the same item by the small-scale fish farmers.
6. If NGV value is negative (-) there is no need for improvement on that item because the level of need for that item is lower than the level of performance of that item be small-scale fish farmers.

**Research Question 1**

What are the entrepreneurial skills improvements needs by small-scale fish farmers in feeding fish at various stages?

**Table 1:** Performance gap analysis of mean rating of responses of extension agents and small-scale fish farmers on feeding fish at various stages

.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N**  **Sallau, Yushau** | **SKILL ITEMS** | **Xn** | **Xp** | **NPG**  **Xn -Xp** | **REMARK** |
|  | Feed fingerlings appropriately | 3.5088 | 2.1185 | 1.39 | IN |
|  | Feed fish with a well balanced diet and adequate feeding to achieve good growth & high profit margin. | 3.5789 | 2.1372 | 1.44 | IN |
|  | Feed fish with adequate protein and vitamins. | 1.5585 | 1.9152 | 1.87 | IN |
|  | Feed newly hatched fry after 3 days of hatching with zoo plankton or artemia. | 3.4737 | 2.1372 | 1.44 | IN |
|  | Adjust daily ratio in accordance with the average weigh of the fish. | 3.5088 | 1.6064 | 1.97 | IN |
|  | Starve fish 2 days prior to sexing to reduce stress. | 3.5789 | 1.5426 | 2.04 | IN |
|  | Feed fish with appropriate grade of feed. | 3.4912 | 2.233 | 1.26 | IN |
|  | Fertilize the pond phytoplankton | 3.5789 | 2.0064 | 1.57 | IN |
|  | Identify signs and symptoms of hunger/starvation in fish. | 3.5614 | 2.1436 | 1.42 | IN |

**NOTE:** Xn = mean of need, Xp = mean of performance, NPG=need performance gap, IN=improvement needed.

Data in table 1 revealed that 9 items on feeding fish at various stages had their performance gap value ranged from 1.26 – 2.04 and were all positive. This indicates that small-scale fish farmers in Taraba State needs improvement in feeding fish at various stages.

**Research Question 2**

What are the entrepreneurial skills improvement needs by small-scale fish farmers in fish health care management?

**Table 2:** Performance gap analysis of mean rating of responses of extension agents and small-scale fish farmers on fish health care/management.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **SKILL ITEM** | **Xn** | **Xp** | **NPG**  **Xn -Xp** | **REMARK** |
|  | Identify the factors that predispose fish to disease. | 3.614 | 1.6809 | 1.91 | IN |
|  | Identify physical signs of disease condition in fish. | 3.5965 | 1.6909 | 1.96 | IN |
|  | Identify bacterial disease in fish such as furunculosis and caudal peduncle disease. | 3.614 | 1.543 | 2.01 | IN |
|  | Identify fungal infection on fishes such as saprolegniasis. | 3.614 | 1.6089 | 2.13 | IN |
|  | Identify protozoan disease such as whirling disease in fish. | 3.6491 | 1.5179 | 2.06 | IN |
|  | Identify ectoparasites such as helminthes on fishes. | 3.6491 | 1.5904 | 1.89 | IN |
|  | Identify nutritional disease such as aflatocolosis. | 3.5263 | 1.6383 | 1.89 | IN |
|  | Skills on how to administer drugs. | 3.6316 | 1.5638 | 1.07 | IN |
|  | Eliminates stress that lead to disease. | 3.789 | 1.6117 | 1.97 | IN |
|  | Provide water, drugs for prevention | 3.6842 | 1.5479 | 2.14 | IN |

**NOTE:** Xn = mean of need, Xp = mean of performance, NPG=need performance gap, IN=improvement needed.

Data in table 2 revealed that 10 items on fish health care management had their performance gap values ranged from 1.89 – 2.14 and were all positive. This indicated that small-scale fish farmers in Taraba State need improvement in fish health care management practices.

**Discussion of Result**

The finding from table 1 revealed that fish farmers need skills improvement, in all the skills identified in feeding fish in Taraba State. The findings were in agreement with the finding of Jamu and Ayinla (2003). The authors stated in rearing fish, nothing is more important than well balance diet and adequate feeding to achieve good growth and high profit margin. Successful fish farming therefore, demand that the farmer have a good knowledge and appreciation of nutrition, feeds and feeding practices in order to maximize profits. The finding from Table 1 were also in consonance with the study by Bolorunduro (2001). The author affirmed that many factors affect the feeding rates of fish. These include time of the day, season, water temperature, dissolved oxygen levels, and other water quality variables Egwui (2004) also agreed with the finding in Table 1 when he stated that within 2-3 days after hatching (48 hrs at 280c) the yolk sac is absorbed and the hatching is visibly developed into a small fishes and start to search for food, at this stage the fry must be fed on external feed, for its further development and survival. At this stage fry need to be fed a high protein diet frequently and usually in excess.

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The finding from table 2 revealed that farmers need skill improvement in all the 10 skills items on fish health care management. These findings were in agreement with the work of Iwena (2002) who stated that control of diseases in fish can be achieved best by a program of good management. This involves maintaining minimum of stress. The author further stated that every drugs treatment could be carefully considered before administering drugs to avoid negative effect since they can be toxic to fish if concentrations are too high.

Findings from table 2 was also in agreement with the work of Anyanwu (2007). See pg. 17 who found out that horizontal transmission of disease in fish culture occur through infected water, infected food or stocking of infected fish in culture system e.g. Aeromone Septicemia. According to them some pathogens are virulent, causing disease as soon as they invade a fish; however, most diseases in fish are stressed related.

**Conclusion and Recommendations**

In Taraba State, small-scale fish farmer have not been producing fish in large quantity to meet up with demand of the consumers. The low production had led to low supply of fish by the small-scale fish farmers. The result of this study indicated that small-scale fish farmers have some limitation in possession of skills. It was therefore recommended that:-

1. Extension agents should teach small-scale fish farmer’s skills on feeding fish to ensure the acquisition of these skills.
2. The identified skill in fish health care management should be integrated into field training by extension agents for fish farmers for improved output.
3. Ministry of Agriculture in Taraba State should organize workshop and training for small-scale farmers where the identified skills will be packaged into a training manual.

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**ENTREPRENEURIAL COMPETENCIES REQUIRED BY B. TECH (EDUCATION) GRADUATES FOR ECONOMIC TRANSFORMATION IN NIGERIA**

**BY**

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**Abstract**

*This study sought to identify entrepreneurial competencies required by B. Tech (Education) graduates for economic transformation in Nigeria. 30 items questionnaire developed from the literature was used to collect data from the respondents; the entire population of 81 Lecturers from two institutions was used for the study as no sample was taken due to manageable size of the population. Three experts validated the instrument while a reliability coefficient of 0.96 was obtained. The result revealed that entrepreneurial competencies for economic transformation were required by B. Tech (Education) graduates in Nigeria. It was therefore recommended among others that Technology Education institutions and departments should establish and maintain effective linkage with business and industries, as well as chambers of commerce to gain from their wealth of experiences and resources in operating small and medium ventures.*

**Keywords:** Entrepreneurial, Competencies, Graduates, Economic transformation.

**Introduction**

Technical education programme anywhere in the world over is aimed at preparing and providing the learner with employable skills. Technical education according to Uwafo (2010), is the training of technically oriented personnel who are to be the initiators, facilitators and implementers of technological development of a nation, through adequate training of its citizenry on the need to be technologically literate, leading to self-reliance and sustainability.

Bachelor Degree in Technology (Education) B. Tech programme was designed to equip students with the skills, values, attitudes and related knowledge in technology. In the view of Ukonze and Olaitan (2009), Technology education programme is designed to equip graduates with skills in instruction and technical areas of technology to enable them impart same to learners in schools. In most cases, students that graduate from B. Ed (Technology) Programme are without the requisite entrepreneurial competencies that will lead them to economic transformation.

Transformation is an act of transforming or the state of being transformed. Transformation is a marked change as in appearance or character, usually for the better. Economic transformation is a change in the structure of an economy over time from a subsistence economy through industrialization to an industrial or even post-industrial society (Mayhew, 2011). Economic transformation of B. Tech (Education) graduate is therefore the change in the economic status of the individuals from subsistence to the level of affluence.

Students are not rich when they depend on their parents/guardians for financial aid. The situation worsens after graduation when nobody will support them financially. These individuals will depend on their ingenuity and creativity to improve their financial status. The opportunity they have is the entrepreneurial competency possessed by them. This will go a long way transforming their economic base, making them self-reliant and improve the economy of the nation.

According to Bulama (2010) “entrepreneurship prepares people, especially youths to be responsible, enterprising individuals who become entrepreneurs, or entrepreneurial thinkers who contribute to economic development and sustainable communities. It is not based on theory, instead students are immersed in practical experience where they have an opportunity to take-off risk, manage the results and learn from the outcomes”

To achieve this, educational institutions should establish small business ventures and linkages with experienced entrepreneurs, industries and government establishments for support. Experienced entrepreneurs and resource persons from industries should be invited from time to time to encourage and inculcate entrepreneurship in students. Also, involving the private sector and government establishments in the teaching of entrepreneurship would provide more realistic information, materials and experiences to both students and educators. Libraries, business publications, newspapers, journals, textbooks and other resources, as stated by Akinola (2001), are also useful in teaching the students entrepreneurship skills. Osuala (2009) indicated that the practical ways of teaching entrepreneurship skills include demonstration, field trip, project, apprenticeship, industrial attachment and simulation methods.

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However, Hornby (2010) stated that entrepreneurship involves the acquisition of business skills required by an individual to function effectively in generating money for organization. This also requires that the individual must be competent.

Olaitan (2003) stated that to be competent means that the individual has acquired the knowledge, skills and attitudes required in order to perform successfully at a specified proficiency level in a given work. Entrepreneurial competencies required for economic transformation is the knowledge, skills and attitudes to perform successfully at a specified proficiency level in a given work.

Entrepreneurial competencies for economic transformation refer to the knowledge, skills and attitudes that an individual such as a B. Tech (Education) graduate, requires in order to set up business, and become self-employed and also be able to employ others. (Hisrich, Peters and Shepherd, 2008) noticed that Entrepreneurial training involves the establishment of mechanisms that identify potential opportunities and describing the extent to which entrepreneurs are dynamic, flexible, self-regulating and engaged in the process of generating multiple decision framework which will focus on generating process of changes in the environment. Most business opportunities do not suddenly appear, but rather result from an entrepreneur’s alertness to possibilities. Hence, a B. Tech (Education) graduate can be trained to function effectively in any business opportunities.

Entrepreneurial competencies for economic transformation: Kruegen (2000) suggested that the competency for entrepreneurial success as follows:

1. **Integrity:** This is a clear sense of value and beliefs that underpin the creative and business decision taken in difficulty or challenging circumstances.
2. **Conceptual Thinking:** This involves using fresh approaches, coming up with crazy ideas that may just work, leading to radical change or significant improvements; and takes time to listen to new ideas without prejudgment.
3. **Risk taking:** Risking taking means trying something new, and possibly doing it better, beyond what has been done in the past, and the constant challenge that comes with it, is to learn how to make improvement.
4. **Networking:** This is a provision of access to information, expertise, collaboration and sales; and a careful plan and presentation to achieve the result.
5. **Strategic Thinking:** This is to understand and value the planning process, thinking and planning over a significant timescale; recognize external trend and opportunities; and ability to think through any complex implication for business.
6. **Commercial Aptitude:** Keeping up to date with development in the sector; seeks out best practice; and identify opportunities that are not obvious to others.
7. **Decisiveness:** Resolving issue as they arise; without bogging down in analysis during decision making; and responds flexibly to deal with changing priorities.
8. **Optimism:** Persistence in pursuing goals despite obstacles and set back, operate from hope of success rather than from fear of failure; and sees setbacks as due to manageable circumstance rather a personal flaw.

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1. **Customer Sensitivity:** This involves building trust and long term relationship with customers; generates an expectation of high level of customer services; and regularly exceeds customer expectation.
2. **People Focus:** This is creating common purpose with colleagues through share vision and values; sees and value the best in others; build the total capability of the immediate and wider team; and always consider the principle of inclusiveness in planning and dealing with others.

**Statement of the Problem**

B.Tech (Education) graduate with reference to this study is an individual who has completed a four (4) to five(5) years programme in a University or an affiliate Institution, and is neither employed in any job for successful living nor admitted for further studies. These graduates usually move into cities in search of white collar jobs which they may not find. As a result, they may engage in anti-social activities such as stealing, drug abuse, robbery and so on, thereby constituting a menace to the society. If the graduates are trained to acquire entrepreneurial competencies, they can be employed or become self-reliant. Hence, the graduate can be useful to themselves and to their community.

**Purpose of the study**

The major purpose of the study was to determine the entrepreneurial competencies required by B. Tech (Education) graduates for economic transformation. Specifically the study sought to:

* Identify entrepreneurial competencies required by B. Tech (Education) graduates for economic transformation in Nigeria.
* Identify challenges constraining entrepreneurial competencies required by B.Tech (Education) graduates for economic transformation in Nigeria.

**Research Questions**

1. What are the entrepreneurial competencies required by B.Tech (Education) graduates for economic transformation in Nigeria?
2. What are the challenges constraining entrepreneurial competencies required by B. Tech (Education) graduates for economic transformation in Nigeria?

**Methodology**

**Design of the study:** Descriptive survey research design was employed in this study. Ndomi (2003) stated that survey research seeks to find out opinion of a group of people or objects by studying a sample or population of the entire group.

**Area of the study**

The study was conducted at two Federal Colleges of Education (Technical) North Eastern Nigeria. The choice of these federal colleges was informed by the fact that they are offering degree programme in technology education.

**Population for the study**

The population for this study was 81 Lecturers made up of 45 Lecturers, from Federal College of Education Technical) Gombe, and 36 Lecturers from federal college of education (technical) Potiskum. Entire population was used for collection of data for the study, as the population size was rather manageable.

**Instrument for data Collection**

30 item structured-questionnaires was used to collect the data for the study. The questionnaire items generated contained information gathered from the review of Literature. The response scales was five-point Likert scale.

**Validation of the Instrument**

It was face-validated by three lecturers from school of technical Education, Federal College of Education (Technical) Gombe. Cronbach Alpha Reliability Technique was used to determine the internal consistency of the items of the questionnaire. The reliability coefficient obtained was 0.96.

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**Method of Data Collection**

The questionnaire was personally administered by the researchers with the help of two research assistants. The completed questionnaire were collect from the respondents by hand after two weeks, all the copies of the instrument were correctly filled and returned. It was analyzed to generate data used for answering the research questions.

**Method of data Analysis**

The data collected from the respondents were analyzed using mean, standard deviation. likert scale was used, any item whose weighted mean is 3.50 and above was regarded as required while any item whose weighted mean is below 3.50 was regarded as not required. An item that attracts an average of 3.50 and above was considered as an agreement while an item below 3.50 will considered as disagreement.

**Results**

**Research Question 1**: What are the entrepreneurial competencies required by B.Tech (Education) graduates for economic transformation in Nigeria?

**Table 1:** Mean rating and Standard deviation on entrepreneurial competencies required by B. Tech (Education) graduates for economic transformation in Nigeria. N = 81

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Items | X‾ | SD | Remark |
| 1 | Managerial abilities and risk management competencies | 3.94 | 1.06 | Required |
| 2 | Interpersonal and industrial relation competencies | 4.42 | 0.72 | Required |
| 3 | Leadership development competencies | 4.22 | 0.79 | Required |
| 4 | Time management competencies | 4.09 | 0.87 | Required |
| 5 | Creative thinking and innovative competencies | 4.80 | 0.70 | Required |
| 6 | Small business management competencies | 4.51 | 0.50 | Required |
| 7 | Business law and risk protection competencies | 4.13 | 0.71 | Required |
| 8 | Computer appreciation and application competencies | 4.13 | 0.63 | Required |
| 9 | Product development strategies | 4.33 | 0.77 | Required |
| 10 | Conflict/crisis management and negotiation competencies | 4.62 | 0.58 | Required |
| 11 | Technical consultation and interview competencies | 4.60 | 0.69 | Required |
| 12 | Problem solving and decision-making competencies | 3.89 | 0.88 | Required |
| 13 | Assets management and control strategies | 4.40 | 0.78 | Required |
| 14 | Office organization and administration strategies | 3.89 | 1.01 | Required |
| 15 | Technical planning and organization strategies | 3.93 | 1.02 | Required |
| 16 | Technical coordination and control strategies for office service and systems | 4.47 | 0.76 | Required |

**Table 1:** The finding in table 1 revealed that the B.Tech (Education) graduates required all the 16 entrepreneurial competencies for economic transformation in Nigeria. Mean scores for each of the 16 items exceed 3.50 which is the cut off point. The entrepreneurial competencies had their standard deviation ranged from 0.50 – 1.06. This indicated that the respondents were close to one another in their opinion and were also not too far away from the mean.

**Research Question 2:** What are the challenges constraining entrepreneurial competencies required by B. Tech (Education) graduates for economic transformation in Nigeria?

**Table 2:** Mean rating and Standard deviation on challenges constraining entrepreneurial competencies required by B. Ed (Technology) graduates for economic transformation in Nigeria. **N = 81**

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Items | ‾X | SD | Remark |
| 1 | Inadequate information and materials on entrepreneurship education | 4.52 | 1.11 | Agreed |
| 2 | Poor linkage with business, industries and government and non-governmental organization | 4.13 | 1.19 | Agreed |
| 3 | Curriculum inadequacies on the success factors for entrepreneurship development | 4.22 | 1.08 | Agreed |
| 4 | Low level of funding of technical and entrepreneurship education | 4.18 | 0.91 | Agreed |
| 5 | Inadequate equipment, facilities and infrastructures | 3.57 | 1.30 | Agreed |
| 6 | Lack of incentives to motive the educators and instructors | 3.94 | 1.05 | Agreed |
| 7 | Poor organization and supervision Students Industrial Work Experience Scheme (SIWES) | 4.11 | 0.85 | Agreed |
| 8 | Lack of strong government policy and support | 4.05 | 1.18 | Agreed |
| 9 | Lack of support from institutional authorities | 3.97 | 1.10 | Agreed |
| 10 | Inadequate research and development on entrepreneurship | 3.57 | 0.97 | Agreed |
| 11 | Inadequate qualified staff with capacity in entrepreneurship education and training | 3.75 | 0.99 | Agreed |
| 12 | Poor management and maintenance of available resources | 4.27 | 1.07 | Agreed |
| 13 | Lack of model small business establishments and laboratories in the institutions for practice | 4.18 | 0.91 | Agreed |
| 14 | Lack of capacity building programmes, seminars, conferences and workshops on entrepreneurship for staff | 4.22 | 1.08 | Agreed |

**Table 2**: The finding revealed that the challenges constraining entrepreneurial competencies of B. Ed (Technology) graduates for economic transformation had their mean ranged from 3.57 – 4.52. Mean scores for each of the 14 items exceeded the 3.50 cut off point. The respondents agreed on 14 items as challenges constraining entrepreneurial competencies of B. Tech (Education) graduates for economic transformation. The standard deviation ranged from 0.91 – 1.18. This indicated that the respondents were close to one another in their opinion and were also not too far away from the mean.

**Discussion of Findings**

Table 1 showed that all the 16 Entrepreneurial Competencies identified were required by graduates of Bachelor of degree in Education (Technology) for economic transformation.

These findings are in consonance with many related articles, reports and literature. Obeta (2006) stated that entrepreneurial competency has to do with the element of creativity training which stem for new solution from previous ones. The author noted that competencies for entrepreneurship is one’s ability to control negative feelings, control destructive emotions, and be clear about what is required and take responsibility of one’s own feelings, sell ideas and view to all customers with deep trust to face responsibilities even when others do not agree. This implies that graduates of B. Tech (Education) should focus on tasks to be accomplished no matter what happens, there should be committed to finding answers and possesses confident expectation of success rather than negative emotion such as fear and disappointment. This is a sure way of meeting the economic transformation needs of the present age without compromising the ability of the future generation.

Table 2 revealed that all the 14 challenges of entrepreneurial competencies identified were agreed as constraints for graduates of B. Tech (Education) in the economic transformation in Nigeria. This finding is in line with Olufunwa (2009) who pointed out that the challenges of development of entrepreneurship skills include low level funding, lack of equipment and infrastructural facilities for training, shortage of qualified manpower and poor management of the available resources. The result validates the statement of Akinola (2001) that entrepreneurship education must be included in tertiary institutions’ curricula so that educators must be adequately trained and motivated with adequate incentives, instructional resources and funding to teach students entrepreneurship competencies with creativity and innovations.

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The standard deviations revealed that the respondents were closely together in their opinions on the entrepreneurial competencies required and challenges by B. Tech (Education) graduates for economic transformation in Nigeria.

**Conclusion**

At face of economic recession, entrepreneurial competencies development is a programme of human capital that can development the B. Tech (Education) graduates by instilling and preserving entrepreneurial climate to boost their economic transformation.

However, entrepreneurship competencies development in technology education of affiliated institutions in Gombe and Potiskum, Nigeria is still very low due to many challenges such as: poor linkage with industries, government non-governmental organizations; low level of funding of business and entrepreneurship education, lack of incentives to motivate the educators of entrepreneurship development.

**Recommendations**

Based on the findings of the study the following recommendations were made:

1. Graduates of B. Tech (Education) should possess entrepreneurial competencies in order to secure a job, and create job opportunity for others and reduce unemployment.
2. Lecturers in Technology Education Trade should be retrained for entrepreneurial competencies to ensure that graduates are well prepared for economic transformation.
3. Entrepreneurial competency in Technology Education is increasingly seen as crucial to economic transformation as such the Federal and State Ministries of Education and the agencies involve in Technology Education should ensure that the training institutions are provided with enabling facilities for the acquisition of entrepreneurial competencies.
4. Technology Education institutions and departments should establish and maintain effective linkage with business and industries, as well as chambers of commerce to gain from their wealth of experiences and resources in operating small and medium ventures.
5. Technology Education departments should be encouraged to establish on-campus small business ventures as models and vital components for teaching entrepreneurship. Technology Education Students should be allowed to participate in the organization and administration of such business ventures to improve their creative and innovative attitudes as well as their desire to become small business operators after graduation.
6. The Student Industrial Experience Scheme (SIWES) should be regularly reviewed to ensure proper organization and supervision.
7. Funding of entrepreneurship education in the institutions should be greatly increased through government and private partnership supporting infrastructures for entrepreneurship development.

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**FUNCTIONALITY OF FACILITIES OF ELECTRICAL INSTALLATION AND MAINTENANCE WORKS PROGRAMME OF TECHNICAL COLLEGES IN NORTH-EAST ZONE OF NIGERIA**

**BY**

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**Abstract**

*The study investigated the functionality of facilities in technical colleges in the North-East Zone of Nigeria. One purpose of study was stated, one research question answered and one null hypothesis tested at 0.05 level of significance. The study employed descriptive survey research design in which a 57-item questionnaire collected data from a sample of 42 respondents, made up of 10 principals, 22 teachers and 10 workshop attendants, which were randomly selected from 10 technical colleges. Mean and standard deviation were used to answer the research question. The Analysis of Variance (F-statistic) was used to test the null hypothesis. Findings of the study showed that 20 out of 26 equipment were moderately functional, which included workbench, winding machine, clamp, battery charger and DC motor. Fourteen out of 16 tools were rated functionally moderate. Those rated functionally moderate included screw drivers, mallet, reamers, strippers and gimlet. Five of the 15 measuring instruments were rated moderately functional. The remaining 10 measuring instruments were rated functionally low. They included A.C. voltmeter, energy meter (both single phase and three phase) and oscilloscope. The finding further revealed that there was no significant difference in the mean scores of principals, teachers and workshop attendants on the extent to which facilities were functional for a minimum class size. The null hypothesis, Ho, was therefore, upheld. The study recommended that heads of the technical colleges needed to make concerted effort to ensure facilities supplied to their institutions were functional, properly stored, used and maintained. It also recommended that a close cooperation between technical colleges and industries, especially in areas of manpower training, needed to be fostered. Industries could provide students with the practical know-how, especially during industrial attachment and as well employ the students after graduation*.

**Keywords**: Electrical Installation Evaluation Facilities Functionality Maintenance

**Introduction**

One fundamental problem bedeviling technical and vocational education (TVE) in Nigeria in general and technical institutions in particular is how to garner enough facilities for the training of manpower who will be self-reliant and enterprising. A key answer to this problem is taking a closer look at the already existing facilities in the technical institutions with a view to assessing their true state and making appropriate recommendations on the way forward which is the sole aim of this work.

Nigeria’s National Policy on Education (FRN, 2011) defines technical and vocational education (TVE) as that type of education that equips individuals with knowledge and skills that will make them functional members of the society. According to the National Policy on Education, TVE prepares individuals for various occupations in order for them to participate effectively in the world of work as well as for responsible citizenship. In addition to general education, TVE is viewed as a comprehensive term which deals with studies about technologies and related sciences. It is concerned with the acquisition of practical skills, attitudes, understanding and knowledge that relate to occupations in various sectors of economic and social life.

The National Policy on Education (FRN, 2011) outlines the following as the goals of TVE: 1) Provide trained manpower in the applied sciences, technology and business, particularly at craft, advanced and sub-professional levels; 2) Provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development, and 3) Give training and impart the necessary skills to individuals who shall be self-reliant economically. What these indicate is that recipients of this type of education will be fully equipped to face the challenges of life. If this happens, unemployment and other social vices in the society will be reduced to the barest minimum. This however, is only possible if the right environment is provided for the training and development of those individuals who desire this type of education.

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One type of institution which provides training to individuals to acquire TVE skills are technical colleges. The technical colleges provide training in various trades such as Blocklaying and Concreting, Welding and Fabrication, Refrigeration and Air-conditioning, Carpentry and Joinery, Radio, Television and Electronic Work and Electrical Installation (Omotosho, 2000). The technical colleges, formerly called trade centres, are regarded as the principal vocational institutions in Nigeria that give full vocational training to students (Okoro, 2006).

Electrical Installation and Maintenance Works Programme is the focus of this work. It is a programme that provides training that leads to the production of skilled personnel like craftsmen and technicians who could either secure employment at the end of their training, set up their own businesses or further their studies in Polytechnics, Colleges of Education (Technical) and Universities. Its curriculum covers a period of three years and in the course of the programme, students are expected to use a variety of tools and equipment, culminating in the following behavioural objectives: 1) Demonstrate various experiments involving resistors, capacitors and inductors (Series/parallel connection); 2) Undertake both domestic and industrial installation; 3) Install electrical machines; 4) Prepare and join electrical cables; 5) Install/connect batteries for charging systems; 6) Use tools to dismantle, recoil and recouple an electrical machine (generator or motor); 7) Undertake tests on installations and machines using appropriate tools (National Board for Technical Education, NTE, 2003).

In order for students to undertake these activities successfully and to achieve the required skills, practical teaching is necessary. According to Omosewo (2000), practical teaching develops in students problem solving skills. Andural and Ikyumen (2006) stressed that today a lot emphasis is being placed on practical teaching which prepares recipients for various occupations. Recognizing the importance of practical teaching, the National Board for Technical Education (NBTE, 1992) standards and criteria for accrediting programmes in technical colleges, recommended that the class size for workshop practical work shall be 15 – 20 students. Buttressing this, the National Policy on Education (FRN, 2011) specifies that the teacher-student ratio shall be kept at 1:20.

To undertake practical teaching, facilities are necessary. Educational facilities, according to Olatunbosun (2005), refer to the school plant which includes “permanent and semi-permanent structures as well as items such as machines, laboratory equipment, the chalk board and the cleaner’s tools” (p.24). In this study, facilities refer to any materials – tools, equipment, workshop buildings, technical items and instructional materials – which aid teaching and learning in a practical way.

To ascertain the state of facilities of the Electrical Installation and Maintenance Works Programme of technical colleges in the North-East, evaluation is necessary. The term evaluation, according to Okoro (2000:1), is “the appraisal of the worth or value of a thing or action and the making of appropriate decisions on the basis of such appraisal.” Anikweze (2005:212) defined evaluation as a “process by which relevant data are collected and transformed into information for decision making…” Osuala (2004:255) defined programme evaluation as the “evaluation of the instructional progress as well as evaluation of the product of this process, both combining to determine the effectiveness of the vocational programme in meeting its established objectives.” For this study, evaluation means a systematic process of assessing the appropriateness, value or otherwise of a programme, in this case the Electrical Installation and Maintenance Works Programme, with a view to taking decisions that will serve the best interest for society.

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Government has over the years made concerted effort to develop technical and vocational education (Jantur, 2005). In spite of this however, the performances of students in the Electrical Installation trade for several years leaves much to be desired, as reports from the Yola and Maiduguri Zonal offices of the National Business and Technical Examinations Board (NABTEB) revealed that many students performed poorly in the Electrical Installation trade examination. This condition clearly justifies the observation by Awodi and Ezeigwe (1999) that graduates of our technical colleges are half-baked. Ogunniyi (1999) also rightly observed that the success of any educational programme can be viewed from the behaviour output of students who pass through the programme.

A number of writers have attributed the poor performances of students in the NABTEB examination to factors such as facilities, arguing that there is a close link between facilities and students’ achievement (Abubakar, 2000; Okoro, 2006). If this factor is not addressed, the performances of students in the Electrical Installation trade will worsen and this will derail Nigeria’s effort at technological development. Therefore, the fundamental problem of this study is that technical colleges in the North-East have not been supplied with relevant facilities that are functional, up to date and necessary for improving the performances of students in the Electrical Installation trade, hence the need to address it.

**Purpose of the Study**

To determine the extent to which facilities of the Electrical Installation and Maintenance Works Programme are functional for a minimum class size

**Research Questions**

To what extent are facilities of the Electrical Installation and Maintenance Works Programme functional for a minimum class size?

**Test of Hypothesis**

The study stated and tested the following hypotheses at 0.05 level of significance:

Ho1: There is no significant difference in the mean scores of principals, teachers and workshop attendants on the extent to which facilities are functional for a minimum class size

**Review of Related Literature**

Technical and vocational education (TVE) programmes are skills acquisition programmes. In order to ascertain whether such programmes are providing the needed skills, Okoro (2000) argued that they need to be evaluated from time to time. In this connection, the author listed the purposes of programme evaluation as follows: improvement of programmes, planning of programmes, decision making, accountability and personnel improvement.

One of the things that need to be evaluated in a programme is physical facilities and equipment (Okoro, 2000). According to Caltaldi (1994), facilities in schools and colleges refer to those materials or services that facilitate teaching and learning. Ibe (1998) and Esomonu (2002) saw facilities as the equipment, tools, learning/instructional materials, consumable materials and infrastructure (classrooms, assembly halls, libraries, laboratories and workshops). Yakubu & Mumah, 2001:225) and the National Board for Technical Education (NBTE, 2003) saw facilities as 1) Tools, equipment and training materials 2) Teaching and technical/administrative support staff 3) Infrastructural facilities which include administrative blocks, health centre, conveniences, workshops, laboratories, libraries…4) Utility services such as water, electricity and communication facilities. For this study, facilities refer to all the physical resources as listed in the curriculum of the Electrical Installation and Maintenance Works Programme. The list includes workshops and laboratories, tools and equipment, instruments and consumable materials. The focus of the study is to evaluate the functionality of the facilities with a view to providing useful data that will assist in making meaningful decisions.

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The availability of physical facilities and the functional state of those facilities for the implementation of Electrical Installation and Maintenance Works Programme are of crucial importance. It has been lamented however, that for several years, many technical schools in Nigeria lacked functional facilities to undertake workshop and laboratory practical work (Ogunyemi, 1999); Ngada, 2001; Esomonu, 2002). The separate works of Ezugu (2000) and Garba (2003) buttressed this position when they discovered that in some schools, there were no buildings to house equipment. In other schools, the buildings were there but in a poor state of repair. Yet in other schools, the equipment was there but it was in short supply and was grossly ill-maintained and many were non-functional.

There are certain factors that have been attributed to this development. For instance, Dogo (1997), Adegun (2001) and Onyejemezi (2001) held that the reason tools, equipment and other forms of instructional materials in our schools are not available and available ones are non-functional is due to neglect. Buttressing this point, Oguntuase (1997) said that Nigerian people have a lukewarm attitude towards government property. In other words, government property is seen as no one’s property. Consequently, many technical equipment are left to waste away under the rain, rot in Hungarian containers or are just carted away by unscrupulous individuals (Dalha (1996). This non-challant attitude to public infrastructure, according to Isa (2003) has driven Nigerians to indulge in idleness and wasteful celebrations instead of investing in education.

Problems relating to availability, adequacy and functionality of equipment in schools across Nigeria have led to decline in students’ performances. Most of the schools are unable to meet acceptable standards of performance (Abubakar, 2000; Okoro, 2006). Because there is a close link between students’ performances and facilities, there is an obvious need to ensure facilities in technical colleges in Nigeria in general and the North-East in particular, especially for the Electrical Installation and Maintenance Works Programme, are not only available and adequate but functional as well.

**Methodology**

Descriptive survey research design was used for the study, and the area of the study was the North-East which is located in far northern part of the former Northern Region of Nigeria (National Commission on Colleges of Education, NCCE, 2003). It is comprised of six States, namely, Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe. Adamawa State lies between latitude 8oN and 11oN and latitude 11.5oE and 13.5oE. Borno State is in the semi-arid zone of Nigeria. Gombe town and its environs are in the Guinea Savannah land. Taraba State lies between latitude 6o 30″ and 9o 36 ″N and longitude 9o 10″ 11o 50″E. Damaturu, the capital of Yobe State, lies approximately on latitude 11o 14′ N, latitude 11o 58′ N (Abdullahi & Musa, 2004). In view of factors related to funding, staffing, and equipment, the study was limited to the 29 State-owned technical colleges. However, only 24 of the technical colleges were found to be running the Electrical Installation and Maintenance Works programme.

The instrument for data collection was a structured questionnaire, developed by the researchers. It has only one section, i.e. Section A, based on the purpose of the study. It dealt with the functionality of available workshop facilities for the Electrical Installation and Maintenance Works Programme. The questionnaire was treated on a five-point rating scale, as follows:

Very Highly Functional (VHF) -5 points

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Highly Functional (HF) -4 points

Moderately Functional (MF) -3 points

Functionally Low (FL) -2 points

Very Functionally Low (VFL) -1 point

The instrument was validated by three experts in evaluation studies. The reliability of the instrument, established through Pearson Product Moment Correlation Coefficient, using test re-test method, was found to be 0.94. The instrument collected data from a sample of 42 respondents, made up of 10 principals, 10 workshop attendants and 22 teachers. Mean () and standard deviation (б) were used in analyzing the data for answering the research questions, while the F-ratio (Analysis of Variance, ANOVA) was used to test the null hypotheses at a 0.05 level of significance. The true limits of real numbers for the mean scores, presented in Table 2, were used in taking decision regarding the research questions.

The true limits of real numbers for the mean scores, presented in Table 1, were used in taking decision regarding the research question.

**Table 1:** True Limits of Real Numbers for the Five-point Rating Scale and their Designations

LIMITS DESIGNATION

4.50 – 5.49 Very Highly Functional (VHF)

3.50 – 4.49 Highly Functional (HF)

2.50 – 3.49 Moderately Functional (MF)

1.50 – 2.49 Functionally Low (FL)

0.50 - 1.49 Very Functionally Low

To effect decision, a mean score () of 3.50 and above was considered functional as an ideal condition. Any opinion with a mean of less than 3.50 was considered invalid and therefore, outside the ideal condition. The decision rule for the F-ratio was upholding the null hypothesis, if the calculated F-ratio is lower than the critical F-ratio and rejecting it if the calculated F-ratio exceeds the critical F-ratio.

**Results and Analyses**

The results were presented in tables based on the research questions and hypotheses.

***Research Question***

To what extent are available facilities functional for a minimum class size?

Tables 2, 3 and 4 present the results of respondents on the extent to which available facilities for the Electrical Installation and Maintenance Works Programme are functional for answering the research question.

**Table 2:** Mean and Standard Deviation of Principals, Teachers and Workshop Attendants on the Level to Which Equipment are Functional

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | ITEMS | RESPONDENT CATEGORIES | | | | | | | | |  |
|  |  |  | Principals | | Teachers | | Workshop Attendants | | | |  |
|  |  |  | N1  = 10  1б1 | | N2 = 22  2 б2 | | N3 = 10  3б3 G | | | | REMARK |
| 1. | Work bench | 3.40 | 0.91 | 3.20 | 0.95 | 2.41 | | 1.32 | 3.00 | Mod | |
| 2. | Crow bar | 2.90 | 1.72 | 2.30 | 1.73 | 2.50 | | 1.39 | 2.57 | Mod | |
| 3. | Conduit bending machine | 3.30 | 0.95 | 3.42 | 1.01 | 2.90 | | 1.51 | 3.21 | Mod | |
| 4. | Stock and dies | 2.90 | 1.65 | 2.70 | 1.39 | 2.00 | | 1.72 | 2.53 | Mod | |
| 5 | Clamp | 2.50 | 1.39 | 2.31 | 1.56 | 2.60 | | 1.67 | 2.80 | Mod | |
| 6 | Winding machine | 3.20 | 0.89 | 3.00 | 0.93 | 2.80 | | 2.81 | 3.00 | Mod | |
| 7 | Battery charger | 2.70 | 1.87 | 2.90 | 1.63 | 3.10 | | 0.92 | 2.90 | Mod | |
| 8 | Wiring boards | 3.50 | 0.99 | 3.21 | 1.02 | 3.40 | | 0.98 | 3.37 | Mod | |
| 9 | Ladder | 2.90 | 1.97 | 2.32 | 1.59 | 2.00 | | 1.65 | 2.41 | Mod | |
| 10  ***Kwami, Manabete & Onuh*** | Blow lamp | 2.70 | 1.81 | 2.31 | 1.39 | 2.50 | | 1.59 | 2.50 | Mod | |
| 11 | Pot and Ladle | 2.60 | 1.52 | 2.43 | 1.21 | 2.60 | | 1.63 | 2.54 | Mod | |
| 12 | Goggle | 2.90 | 1.67 | 2.70 | 1.51 | 2.90 | | 1.71 | 2.83 | Mod | |
| 13 | Soldering iron | 3.20 | 0.93 | 2.92 | 1.71 | 2.70 | | 1.83 | 2.94 | Mod | |
| 14 | Soldering bit | 3.10 | 0.92 | 3.24 | 0.99 | 3.00 | | 0.89 | 3.11 | Mod | |
| 15 | Hand gloves | 3.40 | 0.99 | 3.14 | 0.96 | 3.20 | | 0.95 | 3.25 | Mod | |
| 16 | First aid box | 2.50 | 1.63 | 2.40 | 1.34 | 2.20 | | 1.41 | 2.37 | Mod | |
| 17 | Overalls | 3.00 | 0.83 | 3.00 | 0.91 | 3.00 | | 0.98 | 3.00 | Mod. | |
| 18 | Transformers (various types) | 2.20 | 1.61 | 2.30 | 1.35 | 2.40 | | 1.81 | 2.30 | Low | |
| 19 | D.C Motor | 2.50 | 1.73 | 2.90 | 1.41 | 2.70 | | 1.05 | 2.70 | Mod | |
| 20 | A.C. Motor (1- phase) | 2.30 | 1.53 | 2.40 | 1.53 | 2.00 | | 0.79 | 2.23 | Low | |
| 21 | A.C. Motor (3-phase) | 2.40 | 1.69 | 2.60 | 1.42 | 2.30 | | 1.03 | 2.43 | Low | |
| 22 | D.C generator | 2.70 | 1.76 | 2.80 | 1.69 | 2.60 | | 1.91 | 2.70 | Mod | |
| 23 | A.C. Generator (1-phase) | 2.30 | 1.81 | 2.40 | 1.79 | 2.50 | | 1.72 | 2.40 | Low | |
| 24 | A.C Generator (3 Phase) | 2.00 | 1.69 | 2.20 | 1.63 | 2.30 | | 1.53 | 2.17 | Low | |
| 25 | Starters (Direct on Line0 | 2.90 | 1.83 | 2.7 | 1.87 | 2.50 | | 1.73 | 2.70 | Mod | |
| 26 | Circuit breaker | 2.30 | 1.73 | 2.41 | 1.34 | 2.1 | | 1.31 | 2.27 | Low | |
|  |  |  |  |  |  |  | |  | 2.67 | Mod. | |

In Table 2, out of the twenty 26 items, 20 are moderately functional, six are functionally low. The deviations of respondents’ scores from the mean scores range from 0.83 to 1.97. The grand mean score of all the items on the table is 2.67. This means that equipment for the Electrical Installation and Maintenance Works Programme are moderately functional.

**Table 3:** Mean and Standard Deviation of Principals, Teachers and Workshop Attendants on the Level to Which Tools are Functional

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | ITEMS | RESPONDENT CATEGORIES | | | | | | | | | |
|  |  |  | | Principals | | Teachers | | Workshop Attendants | |  |  |
|  |  |  | | N1  = 10  1б1 | | N2 = 22  2 б2 | | N3 = 10  3б3 | | G | DEC. |
| 1. | Screw driver |  |  | 3.20 | 0.87 | 3.52 | 0.95 | 2.90 | 1.73 | 3.21 | Mod |
| 2. | Allen keys |  |  | 2.40 | 1.65 | 2.13 | 1.73 | 2.40 | 1.84 | 2.31 | Low |
| 3. | Hammers |  |  | 3.30 | 1.35 | 2.54 | 0.98 | 3.10 | 0.97 | 2.94 | Mod |
| 4. | Pliers |  |  | 3.50 | 0.99 | 3.74 | 0.92 | 3.00 | 0.88 | 3.41 | Mod |
| 5 | Cutter |  |  | 3.70 | 0.93 | 3.42 | 0.89 | 3.20 | 0.98 | 3.44 | Mod |
| 6 | Strippers |  |  | 2.90 | 1.71 | 3.00 | 0.97 | 2.90 | 1.81 | 2.90 | Mod |
| 7 | Mallet |  |  | 3.00 | 1.03 | 2.92 | 1.63 | 2.30 | 1.35 | 2.74 | Mod |
| 8 | Hack saw |  |  | 2.30 | 1.84 | 3.51 | 0.92 | 2.10 | 1.61 | 2.64 | Mod |
| 9 | Files |  |  | 2.80 | 1.94 | 3.00 | 0.91 | 2.90 | 1.72 | 2.90 | Mod |
| 10 | Taps and dies |  |  | 3.50 | 0.89 | 3.32 | 0.95 | 3.50 | 1.01 | 3.44 | Mod |
| 11 | Drills (Manual) |  |  | 2.10 | 1.61 | 3.23 | 0.97 | 2.40 | 1.78 | 2.58 | Mod |
| 12 | Drills (Electronic) |  |  | 2.40 | 1.83 | 3.20 | 0.93 | 3.00 | 0.92 | 2.87 | Mod |
| 13 | Reamers |  |  | 3.10 | 0.89 | 3.31 | 0.95 | 3.00 | 0.89 | 3.14 | Mod |
| 4 | Knives |  |  | 3.30 | 0.99 | 3.14 | 0.99 | 3.40 | 0.96 | 3.28 | Mod |
| 15 | Raul plug |  |  | 3.00 | 0.85 | 3.21 | 0.94 | 3.40 | 0.89 | 2.20 | Low |
| 16 | Gimlet |  |  | 3.20 | 0.96 | 3.12 | 0.92 | 3.30 | 0.99 | 3.21 | Mod |
| 2.95 Mod | | | | | | | | | | | |

In Table 3, all the 16 tools save two have been rated moderately functional by respondents. They include screw drivers, strippers and gimlet. Their grand means range from 2.58 to 3.44. Allen keys and gimlet have been rated low. The deviations of respondents’ scores from the means range from 0.87 to 1.94. The grand mean of all the items on the table is 2.95. This result indicates that tools for the Electrical Installation and Maintenance Works Programme are moderately functional.

**Table 4:** Mean and Standard Deviation of Principals, Teachers and Workshop Attendants on the Level of Functionality of Measuring Instruments

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|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **ITEMS** | **RESPONDENTS CATEGORIES** | | | | | | | | | |
|  |  |  | | | Principals | Teachers | | Workshop Attendants | |  |  |
|  |  |  | | | N1  = 10  1 б1 | N2 = 22  2  б2 | | N3 = 10  3 б3 | | G | DEC. |
| 1. | A.C ammeters (various) |  |  | 2.40 | 1.11 | 2.72 | 0.93 | 2.50 | 1.81 | 2.54 | Mod |
| 2. | D.C Ammeter |  |  | 2.30 | 1.17 | 2.51 | 1.32 | 2.20 | 1.32 | 2.34 | Low |
| 3. | D.C Voltmer |  |  | 2.20 | 1.09 | 2.32 | 1.92 | 2.40 | 1.43 | 2.64 | Mod. |
| 4. | A.C Voltmeter |  |  | 2.40 | 1.01 | 2.42 | 1.81 | 2.50 | 1.09 | 2.44 | Low |
| 5 | Avometer |  |  | 2.50 | 1.03 | 2.31 | 1.72 | 2.20 | 1.30 | 2.34 | Low |
| 6 | Energy meter (1-phase) |  |  | 2.30 | 1.21 | 2.31 | 1.59 | 2.50 | 1.39 | 2.37 | Low |
| 7 | Energy meter (3-phase) |  |  | 2.40 | 1.71 | 2.62 | 1.03 | 2.20 | 1.41 | 2.41 | Low |
| 8 | Mega (insulation tester) |  |  | 2.50 | 1.08 | 2.15 | 1.92 | 2.30 | 1.52 | 2.32 | Low |
| 9 | Neon tester |  |  | 2.50 | 1.22 | 2.31 | 1.81 | 2.40 | 1.36 | 2.40 | Low |
| 10 | Oscilloscope |  |  | 2.10 | 1.03 | 2.43 | 1.35 | 2.10 | 1.73 | 2.21 | Low |
| 11 | Hydrometer |  |  | 2.40 | 1.08 | 2.21 | 1.41 | 2.30 | 1.33 | 2.30 | Low |
| 12 | Measuring tape |  |  | 3.90 | 1.12 | 3.24 | 0.99 | 3.50 | 0.94 | 3.21 | Mod |
| 13 | Signal generator |  |  | 2.30 | 1.35 | 2.52 | 0.93 | 2.40 | 1.03 | 2.41 | Low |
| 14 | Rheostat |  |  | 3.30 | 0.97 | 3.0 | 1.01 | 2.50 | 1.11 | 2.93 | Mod |
| 15 | Bell and battery |  |  | 3.50 | 1.14 | 3.3 | 0.97 | 3.00 | 1.01 | 3.27 | Mod |
|  |  |  |  |  |  |  |  |  |  | 2.54 | Mod |

In Table 4, five of the 15 measuring instruments have been rated moderately functional by respondents. They include A.C. ammeter, D.C. voltmeter and rheostat. Their grand means range from 2.58 to 3.27. The remaining 10 measuring instruments have been rated low by respondents. They include avometer and neon tester. Their grand means range from 2.21 to 2.44. The deviations of respondents’ scores from the means range from 0.93 to 1.92. The grand mean of all the items on the table is 2.54 which shows that the items are moderately functional.

**Hypothesis**

There is no significant difference in the mean scores of principals, teachers and workshop attendants on the extent to which facilities are functional for a minimum class size. The data in Table 5 were used to test this hypothesis.

**Table 5:** Analysis of Variance (ANOVA) Test for Comparing the Mean Scores of Principals, Teachers and Workshop Attendants on the Extent to Which Facilities are Functional

|  |
| --- |
| Sources of df Sum of Mean F-cal F-critical Significance Decision  Variation Squares Squares |
| Between  Means 2 0.05 0.02  0.09 4.26 N S Uphold  Within  Means 9 1.96 0.22 |
| TOTAL 11 2.01 |

Table 5 presents the result which was obtained when the hypothesis was tested at 2 and 9 degrees of freedom and 0.05 level of significance. The ANOVA test indicates that F-cal of 0.09 is less than the F-tab of 4.26. Therefore, a significant difference does not exist in the mean scores of principals, teachers and workshop attendants on the extent to which facilities are functional for a minimum class size. The null hypothesis, Ho, is upheld.

**Summary of Findings**

1. Twenty out of 26 equipment were moderately functional, six were functionally low. Those rated moderately functional included workbench, winding machine, clamp, battery charger and DC motor.
2. Fourteen out of 16 tools were rated functionally moderate. Those rated functionally moderate included screw drivers, mallet, reamers, strippers and gimlet
3. Five of the 15 measuring instruments were rated moderately functionally low. The remaining 10 were rated functionally low. They included A.C. voltmeter, energy meter (both single phase and three phase) and oscilloscope.

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1. At the chosen probability level, there was no significant difference in the mean scores of principals, teachers and workshop attendants on the extent to which facilities were functional for a minimum class size. The null hypothesis, Ho, was therefore, upheld.

**Discussion of Findings**

In Tables 2, 3 and 4, the study found that certain machines such as transformer, A.C. and D.C. motors and A.C. generators were functionally low. This finding is supported by the work of Muazu (2003) who found that in 10 Vocational Schools and 3 Technical Colleges in Adamawa State, quite a substantial number of equipment which were installed were not functional. Generally however, this study found that facilities for the Electrical Installation and Maintenance Works Programme were moderately functional. This finding is in line with the work of Omozokpia (2001) who found that hand tools, machines, instruments, lubricants, spare parts and consumable materials essential for production work in engineering trades cluster of technical colleges in Northern Nigeria were moderately functional. The finding of this study is further supported by the works of Okwelle (1994) and John and Adeyemi (1999) who found that in many schools in Nigeria, quite a number of tools and equipment were not adequately functional. It was against this background that Okwelle and John and Adeyemi concluded that many TVE programmes in Nigeria suffer or waste away.

In Table 5, it was found that a significant difference did not exist in the mean scores of principals, teachers and workshop attendants on the extent to which facilities were functional. In other words, the opinion of teachers on the extent to which facilities for the programme of Electrical Installation and Maintenance Works were functional was not different from the opinion of workshop attendants. This finding is in contrast to the finding by Ebenehi (2006) in which a significant difference existed between the mean scores of professional and non-professional teachers on the content of the Introductory Technology curriculum, and attributed the difference to either chance or difference in their professional areas.

**Conclusion and Recommendations**

This work evaluated the functionality of facilities of Electrical Installation and Maintenance Works Programme of technical colleges in the North-East Zone of Nigeria. The study employed descriptive survey research design in which a structured questionnaire collected data from principals, teachers and workshop attendants. One purpose of study was stated, one research question answered and one null hypothesis tested at 0.05 level of significance. It was found by the study that most facilities of the Electrical Installation and Maintenance Works Programme were functionally low. The study also found that the difference in the mean scores of principals, teachers and workshop attendants on the extent to which facilities were functional was not significant.

The findings recorded by the study formed the basis for drawing the following conclusions: Facilities for the Electrical Installation and Maintenance Works Programme of technical colleges in the North-East fell short of the requirement for running the programme. Secondly, students’ poor performances in the Electrical Installation trade could be attributed to the poor functional state of facilities in the institutions. Thirdly, the poor performances of students in national examinations of the Electrical Installation Trade is a clear indication that the students lacked the necessary skills and knowledge that would make them functionally self-employed. Fourthly, it is also concluded that if no urgent steps are taken to improve facilities that are functional in the technical colleges, the performances of students in national examinations would worsen. Consequently, without the necessary skills and knowledge, more of them would remain unemployed, giving rise to increase in social vices.

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The findings of the study therefore, implied that the state of facilities in the technical colleges in the North-East, if left unchecked, was likely to render many TVE programmes ineffective. The fact that facilities for the programme of Electrical Installation and Maintenance Works had fallen short of the required standard posed a serious challenge for the government, administrators, teachers and the community of the North-East. If the situation was left to continue, the performances of teachers in implementing the programme would be greatly affected. This would undoubtedly continue to negatively affect students’ performances. There was therefore, evidently the need to foster cooperation among stakeholders in the TVE enterprise so that technical colleges could serve as viable avenues for achieving the goals of technical and vocational education in the North-East in particular and Nigeria in general.

Based on the findings, the study recommended as follows:

1. Heads of the technical colleges need to make concerted effort to ensure facilities supplied to their institutions were functional, properly stored, used and maintained.
2. There is need for a close cooperation between technical colleges and industries, especially in areas of manpower training. Industries could provide students with practical know-how, especially during industrial attachment. The industries could as well employ the students after graduation.
3. Government should fund and equip the existing technical colleges instead of setting up new ones, which is capital intensive. This way, the standard of the technical colleges would greatly improve.

The pathway for Nigeria’s growth and development is through technology. This fact shows that all stakeholders in TVE must make concerted effort to ensure Nigeria competes favourably with the international community, especially in the area of technological development. In view of this, it is hoped that the recommendations made by the study will be given the required attention so technical colleges in the North-East in particular and Nigeria at last will be able to undertake programmes that would lead to the realization of the goals of technical and vocational education.

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**FINITE ELEMENT ANALYSIS OF CONTACT STRESS-STRAIN**

**IN MESHED SPUR GEAR**

**BY**

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**Abstract**

*A gear is a rotating machine part having cut teeth which mesh with another toothed part to transmit rotary motion and power from one shaft to another. Structural analysis has been a key area of research to minimize failure and optimize design. This research presents the structural analysis of contact area in meshed spur gear assembly using finite element analysis (FEA) method. The spur gears were modeled and assembled using Pro/E software and then imported in to ANSYS workbench for the analysis of stress-strain structure. The result showed that CAE tool was an excellent approach for analyzing defect. Also with optimum utilization of integrated CAD/CAE system, the manufacturing industries can greatly improve on their process capabilities, predict possible defects before the manufacturing tryout, identify the causes of defects and achieve high quality components at low cost, in a shorter time and greatly enhance the competitiveness of the industry.*

**Keywords**- Pro/E, CAD/CAE, FEA, Ansys Workbench, Spur-Gear

**Introduction**

Structural analysis is a method on how a structure or a member of a structure behaves when subjected to certain excitation such as shear stress, strain, deflection, etc in a structure under applied load conditions. This can be applicable in machine components such as gear, shaft, pulley, chain, etc. The applications of advanced technologies currently become the inevitable trend of industry development. In the manufacturing field, the traditional manufacturing design and production fault to meet the demands of the competitive market conditions (Wang, 2005). With the rapid development of computer technology and manufacturing technology, there are increasing concerns on how to shorten model design time and machining production period and to enhance manufacturing quality (Nuhu, 2018). Model technology is also migrating gradually from manual design, relying on manual experience and standard machine processing technology to CAD/CAE/CAM (computer-aided design, aided engineering and aided manufacturing) technology. The United States has pioneered implementing computer technology on mould industry, realizing mould CAD/CAE/CAM integrated system and achieving purposes of enhancing mould design effectiveness, manufacture quality, and boosting production period (Lain, 2013).

Computer Aided Design (CAD) is assistance of computer in engineering processes such as creation, optimization, analysis and modifications. It is an integration of Mechanical and Computer technology to aid in the design process like Modeling, Assembly, Drafting, Die Design, Tool Design, Sheet metal, analysis of products. In this paper we have used Pro/Engineer software as CAD software for modeling of spur gears as well as their assembly. Computer Aided Engineering (CAE) is the use of Computer to support engineers in tasks such as analysis, simulation, design, manufacture, planning, diagnosis, and soon. ANSYS workbench software is used for the analysis incorporating pre-processing (geometry creation, meshing), solver and post-processing modules in a graphical user interface. These are general-purpose finite element modeling packages for numerically solving mechanical problems, including static/dynamic structural analysis (both linear and non-linear), heat transfer and fluid problems, as well as acoustic and electro-magnetic problems. In our case ANSYS Workbench 14.0 is used for Stress-Strain Analysis of the spur gear (Fatmir, 2016).

The integration of Computer Aided Design (CAD), Computer Aided Engineering (CAE) and Computer Aided Manufacturing (CAM) is now rapidly implemented in mould making technology through the use of computer simulation to analyze the most active areas of the mould design and predict stress- strain, temperature distribution, fatigue damage, defects and possible failure modes, this is to optimize process parameters and die structure provides a very powerful tool, to ensure high quality, reduce material consumption, reduce mould product development cycle and reduce mould manufacturing cost (Li & Xiaoxiang, 2005 ; Mustapha, 2016). The integrated CAD/CAE system can be used by design engineers to simultaneously check the process and its implementation. The manufacturability, testability, and maintainability can be evaluated, so that the concurrent engineering approach may foresee production problems before putting the design into production (Zhou, 2018).

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Gears are toothed cylindrical wheels used for transmitting mechanical power from one rotating shaft to another. Spur gear is cylindrical in form and has teeth, which are of involute form in most cases (Darle, 2003).

There are several kinds of stresses present in loaded and rotating gear teeth. We have to consider all the possibilities, so that the gears are proportional to keep all the stresses with in design limit. Generally stresses calculated in gear design formula are not necessary true stress, can make it difficult to get correct answer on gear-tooth stresses, because it may not be known whether load is uniformly distributed across the face width and whether properly shared by the two or more pairs of teeth that are in mesh at the same time. So we have to make right assumption that will allow for things like stress concentration, residual stress, misalignment and tooth error, this means that the calculated stress is probably not a true stress. Each gear tooth may be considering as a cantilever beam, when it transmits the load, it subjected to bending (Peter, 2004).

Today finite element method is mostly used for predicting any kinds of stress, strains and deformation in single parts and assembly. For practical consideration the contact stress on involute spur gear can be better approximated using FEM. It is originated for solving complex elastic and structural analysis problem (Sushil & Upendra, 2012).

**Statement of the problem**

The stresses induced in a rotating meshed spur gear damage the gears teeth and lead to a total failure. The aim of the study is to analyze the amount of stresses induced and select the suitable materials that withstand such effect.

**Significance of the study**

The significance of this study is to use advanced technology (approach) to achieve the followings:

1. Reduce the cost of prototype
2. Minimize failure and optimize design.
3. Improve quality of design, performance and manufacture
4. Shortened the period of product development
5. Shortened material consumption
6. Countless trial and error

**Methodology**

The stages for the modeling and analysis of the meshing gears using CAD/CAE tools are:

I. Spur gears modeling and assembling

II. Spur gears analysis

**I. Modeling and assembling of the spur gears**

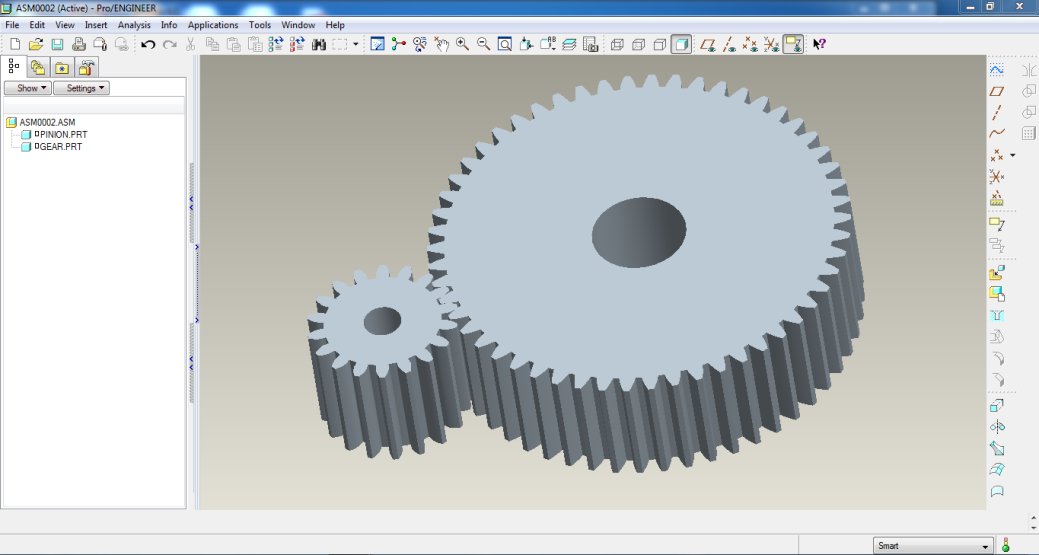
Pro/E software is used for the creation of three-dimensional parametric model and assembly of the spur gears geometry.

Table1: Dimension and parameters for standard 20⁰ full depth involute spur gear with gear ratio 3

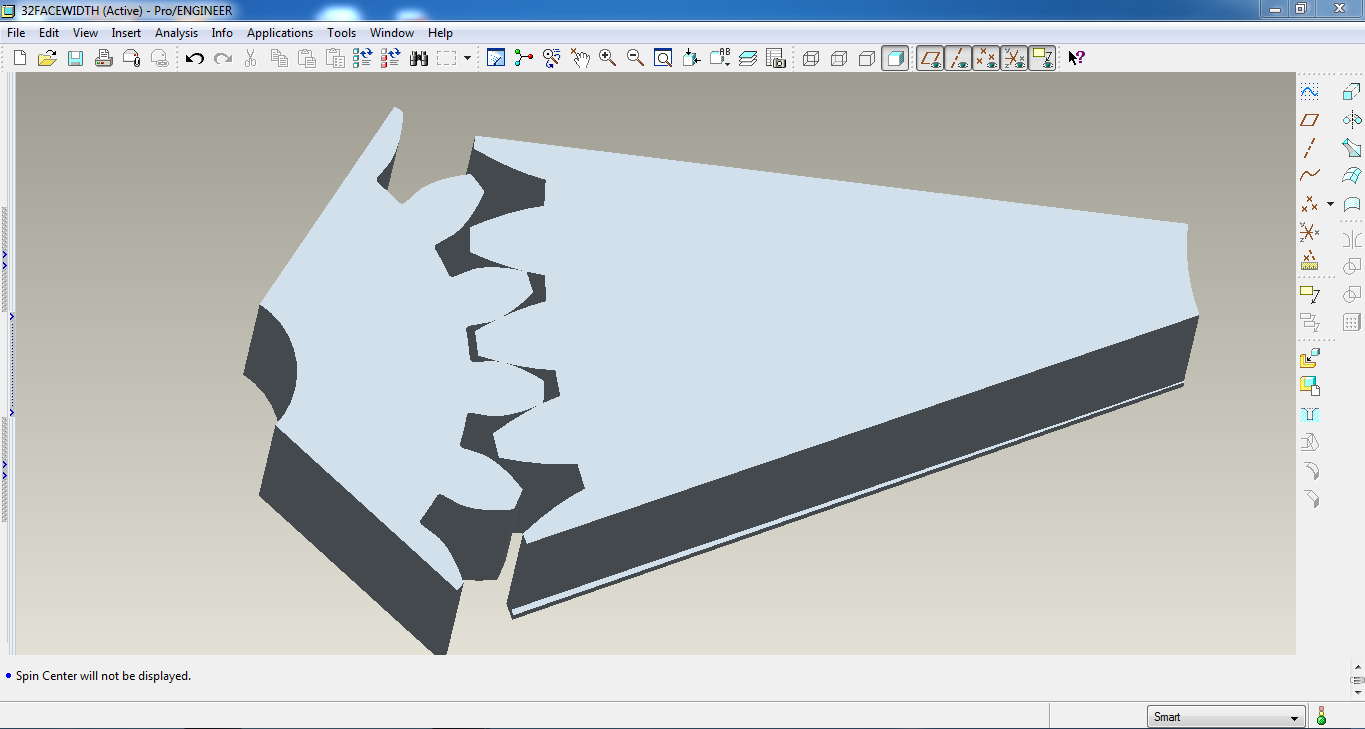
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|  |  |  |
| --- | --- | --- |
| Parameters | Pinion | Gear |
| Number of teeth | 18 | 54 |
| Module | 2.5 | 2.5 |
| Material | ASTM A266 Grade 1 carbon steel | ASTM A266 Grade 1 carbon steel |
| Input speed (rpm) | 1425 | 475 |
| Input power (kW) | 15 | 15 |
| Diameter of pitch circle (mm) | 22.5 | 62.5 |
| Diameter of base circle (mm) | 21.15 | 58.75 |
| Diameter of Addendum circle (mm) | 25 | 65 |
| Diameter of Dedendum circle (mm) | 19.375 | 59.375 |
| Face width (mm) | 30 | 30 |
| Bore diameter (mm) | 20 | 25 |
| Ultimate tensile strength(Mpa) | 460 | 460 |
| Young’s modulus (Mpa) | 2.1 x105 | 2.1 x105 |
| Poisson’s ratio | 0.3 | 0.3 |

The assembling of the gear with pinion is shown in figure 1, using Pro/E software. The axes of pinion and gear were parallel to each other and the center distance of two gears was also equal to the sum of the two pitch circles radius of gear. And at the same time, the tooth surface contact of pinion and gear was tangential to the point of contact. Figure 2 is the spur gear teeth used for analysis.



**Fig.1: ASSEMBLY CREATED in Pro/E**



**Fig.2: Spur gears teeth used for analysis**

**II. Spur gears analysis**

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The meshed spur gear was imported as IGES format to ANSYS workbench for structural analysis. The analysis is done with application of finite element method (FEA).

**A. Mesh generation and boundary condition (supports and load)**

A tetrahedron solid element is used in mesh generations. Boundary condition refers to the external load on the border of the structure. We assumed gear is with fixed support and pinion is subjected to a moment or torque along its axis with frictionless support. The meshing of the gear with pinion is shown in figure 3, using Ansysis workbench software. The material of the gear and pinion is ASTM A266 Grade 1 carbon steel. The aim of the analysis is to obtain the contact stress between the two gears.

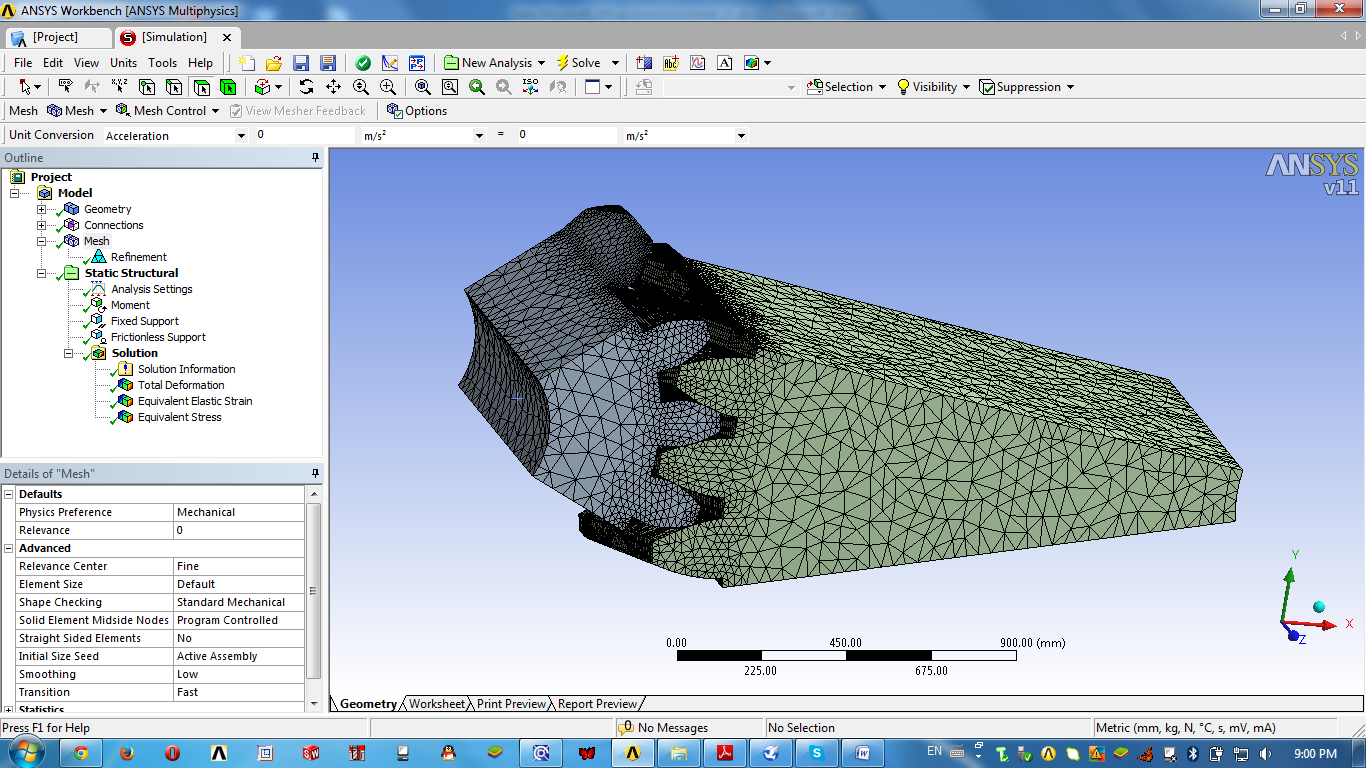


Fig.3: Generated mesh

**B. Contact stress result**

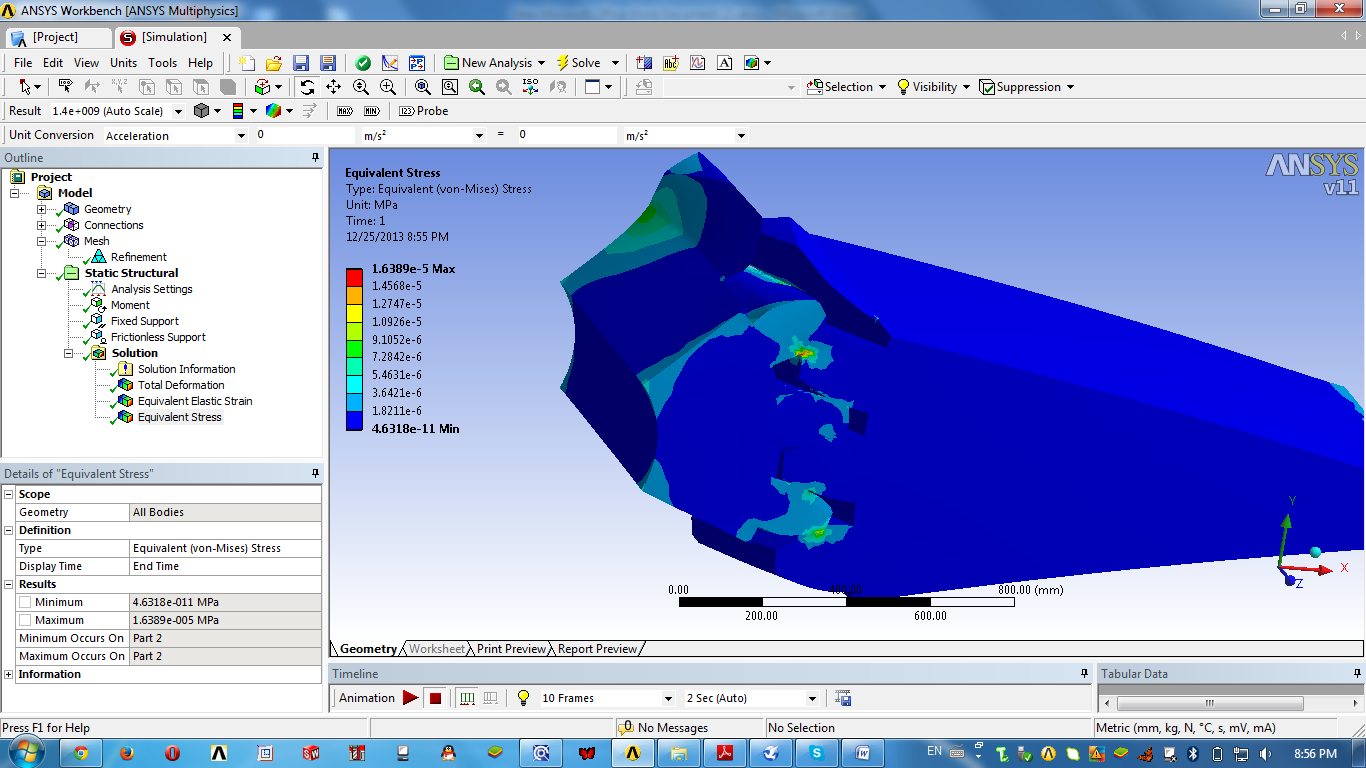


Fig.4: The equivalent elastic stress

**C. Equivalent strain Result**

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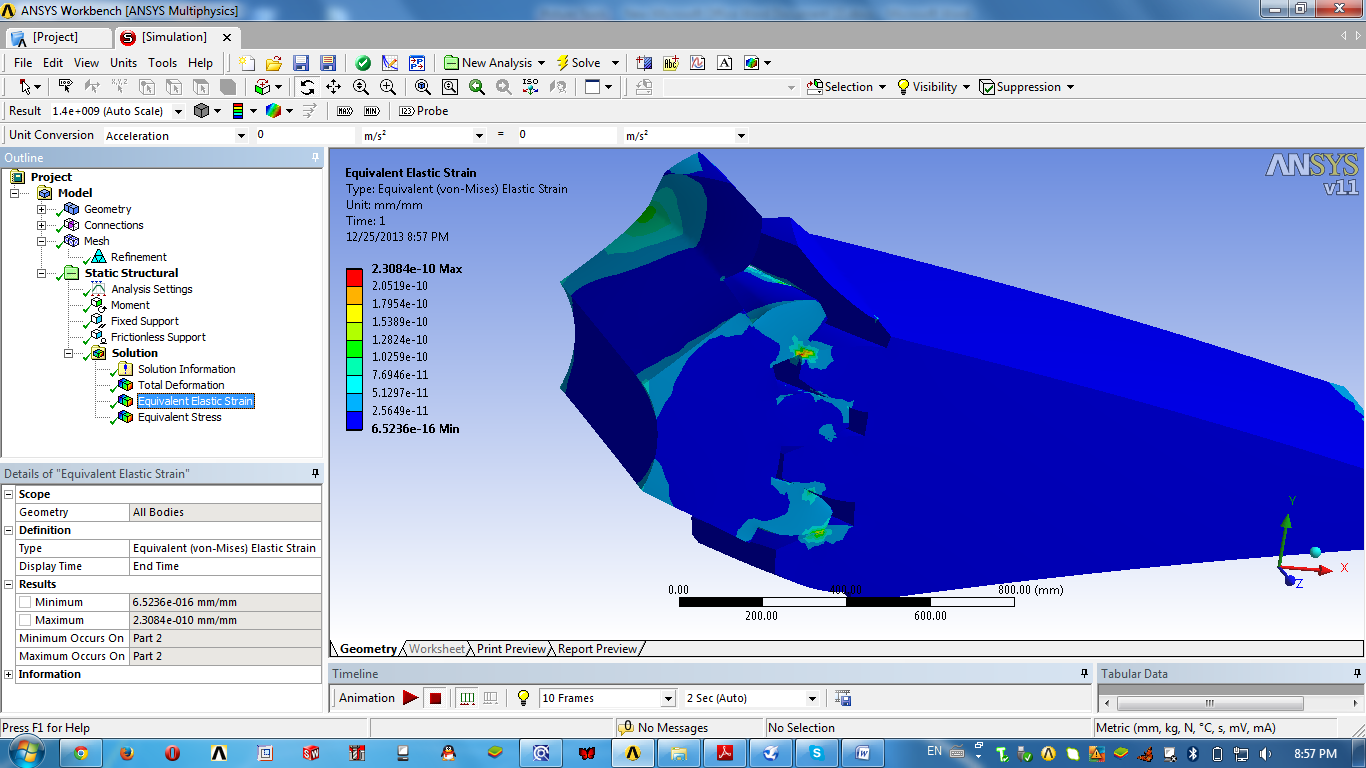


Fig.5: The equivalent elastic strain

**D. Deformation Result**

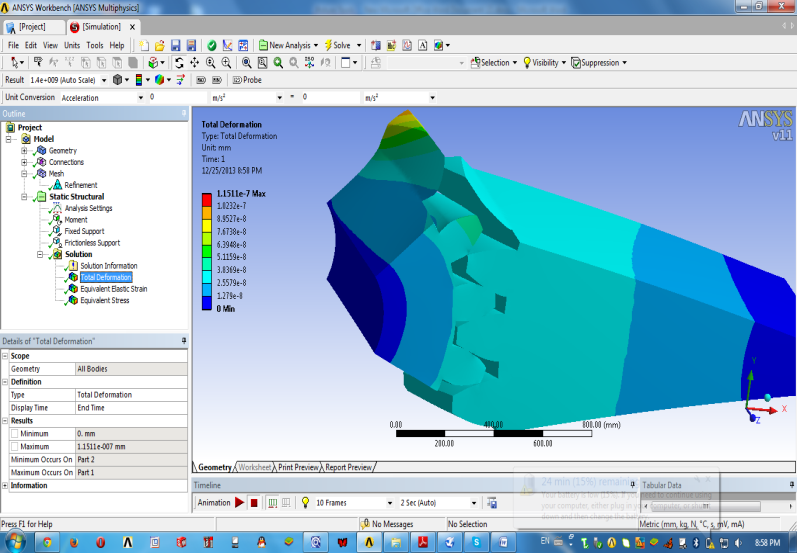


Fig.6: The deformation Results

Table2: Structural Analysis Results

|  |  |  |  |
| --- | --- | --- | --- |
| S/N | Structural Analysis | Minimum Value | Maximum Value |
| 1 | Equivalent von-mises stress (MPa) | 4.6318e-11 | 1.6389e-5 |
| 2 | Equivalent elastic strain (mm/mm) | 6.5236e-16 | 2.3084e-10 |
| 3 | Total deformation (mm) | 0 | 1.1511e-7 |

**Result**

Structural analysis is a method on how a structure or a member of a structure behaves when subjected to certain excitation such as shear stress, strain, deflection, etc in a structure under applied load conditions. Based on the results obtained in table 2, the maximum value of contact stress is 1.6389e-5Mpa which is very less compared to the ultimate tensile strength of the material used=460MPa. Therefore the steel used is able to withstand the effect of shearing stresses between the two contact gears.

**Conclusion**

In this paper structural analysis of meshed spur gear by means of CAD/CAE tool was presented. The spur gears were modeled and assembled using Pro/E software and then imported in to ANSYS WORKBENCH for the analysis of stress-strain structure. Finite Element analysis (FEA) method was used for the analysis of spur gears and based on results obtained, the material that have been used for gears fulfill conditions. It has structural capacity to withstand the effect of contact stress without damage. FEA is the best method for predicting any kinds of stress, strain and deformation in single parts and assembly. The results showed that integrated CAD/CAE system was an excellent approach for modeling, assembling and analyzing defects which prove to be a confident software tools. Also the results showed that, with optimum utilization of CAD/CAE integrated technology can improve quality of design, manufacture, process capabilities, shortened the period of product development and material consumption. Therefore software design and analysis should be encouraged in our factories base on the following facts, long product development, countless trial and error and maximum profit.

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**Recommendations**

Based on the findings of the research study, it was recommended that:

1. New research should be done to analyze contact stress-strain for different types of gears
2. Should use the theoretical method for finding stress-strain and compare the results with CAD/CAE values.
3. The government should adopt and improve the technology through establishing research institute.

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**INFLUENCE OF CLOUD COMPUTING ON TEACHING EFFECTIVENESS AMONG VOCATIONAL EDUCATION LECTURERS IN TERTIARY INSTITUTIONS IN AKWA IBOM STATE**

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**Abstract**

*The main purpose of this study was to determine the influence of cloud computing on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State. Three research questions were answered in the study and three null hypotheses were tested at .05 level of significance. The population of the study comprised 98 lecturers (College of Education, Afaha Nsit – 53 and University of Uyo – 45) Vocational Education Lecturers in tertiary institutions in the State. A sample of 65 (66%) Lecturers was drawn from the population using stratified random sampling technique. A questionnaire with 15 items designed by the researchers was used for data collection for the study. The instrument was subjected to face-validation by three experts in the Department of Vocational Education of the University of Uyo. The internal consistency of the instrument was determined using Cronbach’s Alpha technique and a reliability coefficient of 0.87 was obtained. Mean and standard deviation were used to answer the three research questions. The Analysis of Variance (ANOVA) was used to test hypotheses 1 and 2, while independent t-test was used to test null hypothesis 3 at .05 level of significance. The findings of the study revealed that cloud delivery, resources sharing and assessment have high influence on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State and that there is no significant difference in the mean responses of lecturers on the influence of cloud computing variables on their teaching effectiveness among Vocational Education lecturers in tertiary institutions in Akwa Ibom State. Based on these findings, it was recommended among others that the National University Commission (NUC) should make cloud computing compulsory for lecturers at all levels to ensure teaching effectiveness among them. Based on the findings of the study, it was concluded that if cloud computing is developed appropriately, lecturers’ teaching effectiveness could be enhanced.*

**Keywords:** Cloud computing, Teaching Effectiveness and Vocational Education.

**Introduction**

Vocational education is the pivot on which the wheel of skills acquisition for self-reliance rotates. Oleabhiele, Ugbebor & Erhirhie (2012) asserted that vocational education is the appropriate training in skills, abilities and knowledge both mental and physical given to an individual to enable him/her to enter and progress in a chosen occupation. Vocational education is the comprehensive term referring to the educational process that involves, in addition to the general education, the study of technologies and related sciences and the acquisition of practical skills and knowledge relating to occupation in various sectors of economic and economic life. Oduma (2007) noted that vocational education in the 21st century shall prepare Nigerians regardless of gender, socio-economic status, creed, ethnic affiliation, to take control of their own destiny, liberating them from dependency and endowing them with initiative, creativity and critical thinking, entrepreneurial skills, democratic values and an appreciation of the world of work. The National Policy on Education (FGN, 2013), viewed vocational education as training and retraining programme, which is given in school or class under public supervision and control. The policy stated that goals of vocational education shall be to: provide trained manpower in the applied sciences, technology and business particularly at craft, advanced craft and technical level; provide the technical knowledge and vocational skills necessary for agricultural, commercial and economy development; and give training and impact the necessary skills to individuals for self-reliance economically. If these laudable objectives of vocational education are to be achieved, its lecturers are to be effective in their instructional delivery processes.

Effective instructional delivery is *sine qua non* in vocational education for the purpose of facilitating saleable skills acquisition. The word effective means having an effect, ability to bring about the result intended. It is the ability to accomplish certain task successfully as expected. Elucidating on the word effectiveness, Igwebuike (2008) stated that effectiveness is the ability to get things done rightly. This requires specific skills at specific time and for specific event. Teaching effectiveness implies the ability of a teacher to achieve the expected learning outcome as predetermined by the teacher during lesson preparation, which is measured through evaluation of the level of knowledge acquired by the students after the instructional process (Omoraka, Ajuar&Okandeji, 2012). A teacher can be judged effective only if the learners achieved the predetermined learning outcomes. The teacher must possess an in-depth knowledge of the subject matter and deploy appropriate strategy or combination of strategies to ensure effectiveness. Teacher’s effectiveness in the teaching of vocational courses could be enhance using cloud computing.

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Cloud computing is a standardized information technology capability such as platform, security, infrastructure and software delivered via internet technologies for the purpose of facilitating effective teaching and learning. Cloud computing is increasingly being used by educational institutions in facilitating teaching processes. Basically, it involves a variety of independent technologies such as hardware, virtualization, distributed processing, utility computing, network system, web services, platform as a service and software as a service (Murah, 2012). Cloud computing is a set of hardware and network resources that combines the power of multiple servers to deliver different kinds of services via the web.

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction (United States National Institute of Standards & Technology in Katz, 2009). Although cloud includes a broad set of different services, its most widely used applications are email, itunes, skype, video website, whatsapp, facebook and online data storage (Murah, 2012).

Cloud computing has a lot of benefits in the teaching and learning in schools. It is economical, virtualizable, scalable, accessible as well as having enormous storage capacity. These benefits are delivered to the end user on demand over the Internet. It is a distributed paradigm that enables students and teachers have access to virtual resources. The main strengths of cloud computing are that users have access to resources anywhere and anytime (Alamri&Tureshi, 2015). Schwill (2007) averred that the five characteristics of cloud computing are on-demand self-service, resource pooling, broad network, access rapid elasticity and measured service. Since study materials can be made available for students through the cloud; they could engage in personal study at their convenient time.

Cloud computing brings together infrastructure, software, processes and a range of services. To be called cloud, a solution must meet a number of characteristics. The resource and its content must be available on a self-service on-demand basis, the service must be accessible from everywhere, it must enable sharing and exchange of resources, it should provide flexibility in the structure, allowing for rapid expansion, resizing and the adjustment of capacities and performance based on changes in need or demand (Mladen, 2008). It can assist in instructional delivery, sharing of resource and assessment of students.

Delivery is the process of presenting the planned lesson in the classroom environment or over the cloud. According to Bernstein (2016), delivery is a process of logically presenting instruction in line with the subject theme to students. The author noted further that instructional delivery methods are designed to be as interactive as possible, using relevant and practical case study. There are various media of delivery instruction over the cloud. Instructional delivery is an area where cloud computing can be deployed to ensure effective learning. This relates to the impartation of ideas, values, competences, knowledge and skills by the lecturer to students. It involves the use of various applications and tools such as voice mail, videoconference, YouTube, WhatsApp among others. A video conference is a live, visual connection between two or more people residing in separate locations for the purpose of communication. In its simplest level, video conferencing provides transmission of static images and text between two locations. At its most sophistication level, it provides transmission of full motion video images and high-quality audio between multiple locations. Teaching through video conferencing is a unique method of providing real-time face-to-face interaction that enables immediate peer and lecturer interaction and feedback (Anedrews&Klease, 2008). A guest lecturer can teach students from remote locations using video-conferencing tools and applications such as Skype which can also be projected on a large screen. Lecturers and students will see and hear themselves clearly. They can also participate in the teaching-learning process from the comfort of their homes.

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Cloud delivery techniques are embodiment of methods employed for effective delivery of vocational skills to students to enable them to become skilled and self-reliant. According to Sunita & Singh (2012), cloud delivery techniques are said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, raise the educational quality by enabling knowledge to be spread electronically for a wide range of innovative, informative and educational purposes in order to bring global world into the classroom. It creates interaction and communication links where the teacher manages the human, material, time and space to make sure that instructional events are recalled, provide feedback and provide access to learners to enhance performance. It motivates students learning and at the same time sustains the lecturers’ interest in teaching when bringing varieties of resources into the lesson delivery.

Cloud can facilitate sharing of learning resources, activities and professional collaboration between all participants in the learning processes through sending and receiving of information. Cloud computing supports remote storage, sharing of learning resources, collaboration and interaction between lecturers and students, which are prerequisites for achieving higher efficiency in the educational process. Learning contents created by lecturers using cloud-based tools and services, are the products of collaboration and can be easily shared and disseminated to multiple users. Sharing learning resources allows for improvement and enrichment, avoiding duplication of content and the need for each lecturer to develop on his own (Kiryakova, 2017).Cloud computing creates conditions for an environment where the idea of social constructivism can be achieved. Cloud computing allows easy and unrestricted access for lecturers and learners to services and resources at any time and place through a variety of devices.

A comprehensive accessibility by different devices enables implementation of mobile learning which is characterized not only using mobile devices but above all, by ensuring mobility of participants at any time and place, which is an important factor for the successful implementation of cloud resources sharing in schools. Learners can use their own devices to access lecturers’ lesson note, course materials and other resources shared by Lecturers through WhatsApp or uploaded to institution’s website. Since most students rely on mobile technologies for their daily activities, the use of cloud computing which is mobile devices friendly for educational purposes could be said to be a welcomed development. Cloud resource sharing process is depicted in the model below.

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Lecturer

Students

Download/

Upload

Cloud

Upload/

Download

Remote Area

**Fig. 1:** Model for cloud computing

**Source:** Researchers, 2018

From the above model, it can be observed that both lecturers and students can upload and download learning materials such as class notes, short educational videos, drawings, ebooks, articles and others through various social media applications or websites. It ensures that learning materials are updated regularly and accessed from remote areas anywhere and anytime. This will facilitate effectiveness in teaching processes

More so, learning is said to be incomplete until the value of the behavioural change has been established. According to Asuquo (2010), a child is said to have learnt a concept when the child has been tested and value judgment established regarding the degree of his understanding. According to Ojo (2011) assessment is the global process of synthesizing information about individuals so as describe, understand and perhaps help them better.Apart from carrying out assessment on a face-to-face basis, it can also be carried out using the cloud electronic gadgets such as computers, phones and internet facilities. Here, students are given assessment using various applications such as whatsapp, email and among others. After completing the assessment, students will send their solutions to the lecturer using the prescribed cloud medium and feedback will be sent to the students via the same medium.

In a study carried out by Saju (2012) on implementation of cloud computing in education, it was found that cloud computing aids acquisition of skills, knowledge and competences if well-implemented. Similarly, Almajalid (2013) study on the adoption of cloud computing in education, it was found that adoption of cloud computing can aid development in educational sector. Kiran (2014) found that cloud computing plays a crucial role in education. Also, Murah (2011) who conducted a study on teaching/learning and cloud computing, found that teaching and learning through cloud computing enhances students’ performance. Radenkovic, Despotovic-Zrakic,Bogdanovic, Vujin & Barac (2014) carried out a study on harnessing cloud computing infrastructure for e-learning services. It was found that cloud computing infrastructure enhance learning services. Narale (2016) carried out a study on the use of cloud computing technologies in teacher education and training. The findings of the study showed that all categories of students (bachelor’s degree, masters’ degree and Doctor of Philosophy Students) agreed that cloud computing facilitate effective teaching and learning.Narale (2016) carried out a study on cloud-based teaching and learning environment for smart education. The result of the study showed that cloud computing facilitates learning. It is upon this background that the study was conducted to determine the influence of cloud computing on lecturers’ effectiveness.

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**Statement of Problem**

Over the years, the deteriorating lecturers’ effectiveness as shown in the performance of students in various Vocational Education courses has been worrisome and alarming. Due to this unfortunate development, stakeholders such as parents and policy makers have expressed a great deal of displeasure.

Observation by the researchers seems that lecturers are still attached to the traditional method of chalk and talk practice and recycling of out-dated materials which makes them lag behind in contemporary demand for an improved delivery approach in vocational courses. However, the Federal Ministry of Education had in 2007 advocated for change in the strategies of imparting knowledge in all courses to students. This requires lecturers to embrace computer and Internet technologies as teaching tools to transform the present isolated, lecturer-centred and textbook bound classroom into student-centred and computing environment. Cloud computing learning environment facilitates resource sharing, unlimited access to learning materials, research, assessment and provision of feedback.

Moreso, almost everything is now digitalized, and students spend a lot of time on mobile phones visiting sites, chatting and regrettably feel reluctant to read their notes in hard copies. This situation has affected their performances negatively. It appears that cloud computing could help enhance lecturers’ effectiveness in the teaching-learning processes. However, suspicion, opinion or guess can hardly be a reliable basis of fact. It is against this background that the study was conducted to see whether the application of cloud computing by lecturers could improve their teaching effectiveness.

**Research Questions**

The following research questions guided the study.

1. What is the extent of influence of cloud delivery on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State?
2. What is the extent of influence of cloud resources sharing on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State?
3. What is the extent of influence of cloud assessment on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State?

**Null Hypotheses**

The following null hypotheses were tested at .05 level of significance.

1. There is no significant difference in the mean responses of lecturers on the extent of influence of cloud delivery on their teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State based of years of experience.
2. There is no significant difference in the mean responses of lecturers on the extent of influence of cloud resources sharing on their teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State based on qualification.
3. There is no significant difference in the mean responses of male and female lecturers on the extent of influence of cloud assessment on their teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State.

**Research Method**

The descriptive survey design was adopted for the study. The study was conducted in Akwa Ibom State. The population of the study comprised 98 (College of Education, AfahaNsit – 53 and University of Uyo – 45) Vocational Education Lecturers in tertiary institutions in the State. A sample of 65 (66%) Lecturers was drawn from the population using stratified random sampling technique. The researcher-made structured questionnaire with 15 items which was titled: Influence of Cloud Computing on Teaching Effectiveness Among Vocational Education LecturersQuestionnaire (ICCTEAVELQ) was used for data collection for the study. The questionnaire was divided into two sections (I and II) section ‘I’ contained the personal data of the respondents. Section ‘II’ contained the statements on the variables grouped into three clusters (1-3) namely; cloud delivery, cloud resources sharing and cloud assessment. The response options were: Very High Influence (VHI) - 4 points, High Influence (HI) - 3 points, Moderate Influence (MI) – 2points and No Influence (NI) - 1 point. The instrument was subjected to face-validity by three validators in the Department of Vocational Education of the University of Uyo. The internal consistency of the instrument was determined using Cronbach’s Alpha technique and a reliability coefficient of 0.87 was obtained. The questionnaire was administered on the respondents by the researchers and all the 65 copies were returned. Mean and standard deviation were used to answer the three research questions. The Analysis of Variance (ANOVA) was used to test hypotheses 1 and 2, while independent t-test was used to test null hypothesis 3 all at .05 level of significance. The influence of cloud computing on teaching effectiveness among Vocational Education Lectures was determined using real limit of numbers as follows: Very High Influence (VHI) – 3.50 - 4.00, High Influence (HI) – 250 - 3.49, Moderate Influence (MI) – 1.50 - 2.49 and No Influence (NI) – 0.50 - 1.49. This real limit was applied to research questions. Conversely, in testing the null hypotheses at .05 level of significance, Ho was accepted at the expense of HI when P-value was greater than .05, otherwise Ho rejected.

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**Results**

**Research Question I**

What is the extent of influence of cloud delivery on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State?

Table 1: Mean responses of lecturers on the extent of influence of cloud delivery on teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State

**n = 65**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **What is the extent of influence of cloud delivery on the following items as regards teaching effectiveness among Vocational Education Lecturers** |  | **SD** | **Remark** |
| 1 | Preparing lesson note using the internet | 3.40 | 1.06 | HI |
| 2 | Simulating craft production techniques using a computer system | 3.49 | 1.01 | HI |
| 3 | Playing short videos on new developments in various aspects of Vocational Education courses | 3.62 | 0.83 | VHI |
| 4 | Videoconferencing a remote guest speaker | 3.50 | 1.02 | VHI |
| 5 | Carrying out experiment using virtual laboratory | 2.95 | 0.91 | HI |
|  | **Cluster Mean** | **3.39** | **0.97** | **HI** |

**Source:** Field Survey, 2018

**Key:** **=** Means, SD = Standard Deviation, VHI = Very High Influence, HI = High Influence, MI = Moderate Influence and NI = No Influence.

The result presented in Table 1 shows that cloud delivery has the cluster mean of 3.39. This indicates that the extent to which cloud delivery influence teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State is high. More importantly, the item on playing short videos on new development in various aspects of Vocational Education courses was rated very high with the highest mean of 3.62. This is closely followed by the item on video-conferencing a remote guest speaker with a mean of 3.50. In addition, the standard deviation range of 0.83 - 1.06 indicates that respondents were not divergent in their responses.

**Research Question 2**

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What is the extent of influence of cloud resources sharing on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State?

Table 2: Mean responses of lecturers on the extent of influence of cloud resources sharing on teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State. n = 65

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | What is the extent of influence of cloud resources sharing on the following items as regards teaching effectiveness among Vocational Education Lecturers. |  | SD | Remark |
| 1 | Sharing course materials with students via e-mail | 3.73 | 0.63 | VHI |
| 2 | Facilitating of class discussion through online group | 3.45 | 1.00 | HI |
| 3 | Making recent publications in the field of vocational education available to students in whatsapp group | 3.17 | 0.73 | HI |
| 4 | Accessing the teaching resources of leading vocational based institutions | 3.43 | 0.55 | HI |
| 5 | Using a competent lecture of vocational education to teach students from remote location. | 3.43 | 1.04 | HI |
|  | **Cluster Mean** | **3.44** | **0.83** | **HI** |

**Source:** Field Survey, 2018

**Key:** **=** Means, SD = Standard Deviation, VHI = Very High Influence, HI = High Influence, MI = Moderate Influence and NI = No Influence.

The result presented in Table 2 shows that cloud resources sharing has the cluster mean of 3.44. This shows that the extent to which cloud resources sharing influence teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State is high. Worthy of note is the item on sharing of course materials with students via e-mail which was rated Very High by the respondents, and this has the highest mean (= 3.73). This is followed by the item on facilitating off-class discussion through online group was rated High with a mean of 3.45. More so, the standard deviation range of 0.63 - 1.04 indicates that respondent were convergent in their responses.

**Research Question 3**

What is the extent of influence of cloud assessment on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State?

**Table 3:** Mean responses of lecturers on the extent of influence of cloud assessment on teaching effectiveness in Vocational Education Lecturers in institutions in Akwa Ibom State

**n = 65**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **What is the extent of influence of cloud assessment on the following items as regards teaching effectiveness among Vocational Education Lecturers** |  | **SD** | **Remark** |
| 1 | Giving students assignment through email | 3.11 | 0.80 | HI |
| 2 | Receiving student’s assignment through email | 3.44 | 0.74 | HI |
| 3 | Uploading results of students online | 3.87 | 0.68 | VHI |
| 4 | Using analysis tools in tracking the educational progress of students | 3.07 | 1.03 | HI |
| 5 | Creating portals that will enable parents follow the academic progress of their children. | 3.50 | 1.02 | VHI |
|  | **Cluster Mean** | **3.39** | **0.85** | **HI** |

**Source:** Field Survey, 2017

**Key:** **=** Means, SD = Standard Deviation, VHI = Very High Influence, HI = High Influence, MI = Moderate Influence and NI = No Influence.

The result presented in Table 3 shows that cloud assessment has the cluster mean of 3.39. This indicates that the extent to which cloud assessment influence teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State is high. Worthy of noteis the item on uploading results of students online which was rated very high with means of 3.87. In addition, the standard deviation range of 0.68 - 1.03 indicates that respondents were convergent in their responses.

**Testing of Hypotheses**

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The following hypotheses were tested in the study.

**Null Hypothesis I**

There is no significant difference in the mean responses of lecturers on the extent of influence of cloud delivery on their teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State based on years of experience.

**Table 4**: Analysis of Variance of the difference in the mean responses of lecturers on the extent of Influence of Cloud Delivery on their Teaching Effectiveness in Vocational Education in Tertiary Institutions in Akwa Ibom State Based on Years of Experience

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sources of variations** | **Sum of squares** | **df** | **Mean square** | **F** | **P-value** | **Decision** |
| Between Groups | 1.81 | 2 | .91 | .74 | .406 | NS |
| Within Groups | 75.43 | 62 | 1.22 |  |  |  |
| Total | 77.43 | 64 |  |  |  |  |

Source: (Field Work, 2018). NS = Not significant at .05 level of significance

Table 4 shows a summary of the Analysis of Variance (ANOVA) of the mean responses of Lecturers on the extent to which cloud delivery influence their teaching effectiveness. Since the calculated probability value (p-value) (.406) is greater than alpha level of .05, the null hypothesis which stated that there is no significant difference in the mean responses of lecturers on the influence of cloud delivery on their teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State based on years of experience is therefore retained.

**Null Hypothesis 2**

There is no significant difference in the mean responses of lecturers on the extent of influence of cloud resource sharing on their teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State based on qualification.

**Table 5:** Analysis of Variance of the difference in the mean responses of lecturers on the extent of Influence of cloud resources sharing on their Teaching Effectiveness in Vocational Education in Tertiary Institutions in Akwa Ibom State Based on qualification

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sources of variations** | **Sum of squares** | **df** | **Mean square** | **F** | **P-value** | **Decision** |
| Between Groups | 1.74 | 2 | .87 | .71 | .396 | NS |
| Within Groups | 76.18 | 62 | 1.22 |  |  |  |
| Total | 77.92 | 64 |  |  |  |  |

Source: (Field Work, 2018). NS = Not significant at .05 level of significance

Table 5 shows a summary of the Analysis of Variance (ANOVA) of the mean responses of Lecturers on the extent to which cloud resources sharing influence their teaching effectiveness. Since the calculated probability value (p-value) (.396) is greater than alpha level of .05, the null hypothesis which stated that there is no significant difference in the mean responses of lecturers on the influence of cloud resources sharing on their teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State based on qualification is therefore retained.

**Null Hypothesis 3**

There is no significant difference in the mean responses of male and female lecturers on the extent of influence of cloud assessment on their teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State.

**Table 6:** t-test analysis of the difference in the mean responses of male and female lecturers on the extent of influence of cloud assessment on teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State based on qualification

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|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Gender** | **N** |  | **SD** | **df** | **t-cal** | **P-value** | **Decision** |
| Male X1 | 41 | 12.7 | .710 |  |  |  |  |
|  |  |  |  | 63 | .830 | .257 | NS |
| Female X2 | 24 | 12.5 | .731 |  |  |  |  |

Table 6 shows a summary of the t-test analysis of the difference in the mean responses of male and female Lecturers on the extent to which cloud assessment influence their teaching effectiveness. Since the calculated probability value (p-value) (.257) is greater than alpha level of .05, the null hypothesis which stated there is no significant difference in the mean responses of male and female lecturers on the influence of cloud assessment on their teaching effectiveness in Vocational Education in tertiary institutions in Akwa Ibom State that therefore retained.

**Discussion of Findings of the Study**

The result of research question and hypothesis one indicated that Cloud delivery has a high influence on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State and that there is no significant difference in their responses on the influence of cloud delivery on teaching effectiveness. This finding is in line with the finding of Sagu (2012) who found that cloud computing aid acquisition of skills, knowledge and competence if well-implemented. Also, the finding of Radenkovic, Despotovic-Zrakic, Bogdanovic, Vujin and Barac (2014) who found that cloud computing infrastructure enhance learning service is similar to finding of this study. In recent times, cloud communication and collaboration technologies are bringing down the walls of the classroom, promoting exchanges, group work and inter-school projects. Lecturers can use cloud computing to teach classes in remote areas. Platforms and content hosted in the cloud enable teachers to create collaboration spaces or forums where they can interact and invite colleagues and students to join in and contribute to the development of education. This would enhance teaching effectiveness among lecturers. Using various cloud computing platforms, a lecturer can play short videos and simulate abstract and difficult concept to students to ensure clarity.

The result of research question and hypothesis two shows that Cloud resources sharing has a high influence on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State and that there is no significant difference in their responses on the influence of cloud resources sharing on their teaching effectiveness. This finding is similar to the finding of Almajalid (2013) who found that adoption of cloud computing can aid development in educational sector. Similarly, the finding of this study is in line with the finding of Barhate and Narale (2016) who found that cloud computing facilitates learning. From this finding, the researchers wish to observe that with the use of cloud computing, Vocational Education lecturers can share course materials, and teaching equipment in a manner that even students from remote areas can have access anytime. This could help to remove educational inequalities and poor performance by students. It promotes more dynamic exchange and participation between lecturers and students. It facilitates increase understanding and academic achievement because students would be able to have a clearer view of realities in a course area, thus ensuring lectures’ teaching effectiveness.

The result of question and hypothesis three showed that Cloud assessment has a high influence on teaching effectiveness among Vocational Education Lecturers in tertiary institutions in Akwa Ibom State and that there is no significant difference in their responses on the influence of cloud assessment on their teaching effectiveness. This finding is in consonance with the finding of Murah (2011) who found that teaching and learning through cloud computing enhances performance. A lecturer can give and receive assignment from students through this platform. Even students’ results can be uploaded online for immediate access. A lecturer could also place assessment questions online for students with the use of various computing applications. Students on their own part will answer the questions and send them back to the lecturer for marking using the same medium. After marking the students’ answers, the lecturer send feedback on their performance to the students.

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**Conclusion**

Based on the findings of the study, cloud computing, if deployed appropriately in the areas of delivery, resources sharing and assessment, the teaching effectiveness of lecturers could be enhanced. This is because it makes teaching and learning easier and less tedious.

**Recommendations**

Based on the findings of the study, the following recommendations are made:

1. The National University Commission (NUC) should make cloud computing compulsory for lecturers at all levels to ensure teaching effectiveness among them.
2. Universities in Nigeria should conduct regular training and re-training for lecturers on the use of various cloud computing platforms. This will ensure that lecturers acquire adequate and up-to-date knowledge as regard the use of cloud computing for the purpose of ensuring teaching effectiveness.
3. Lecturers should adopt cloud computing as strategy in teaching their students to ensure effectiveness.

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**INFLUENCE OF HOME AND SCHOOL ENVIRONMENTS ON PUPILS LEARNING IN PRIMARY SCHOOLS IN AKWANGA METROPOLIS**

**BY**

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**Abstract**

*The study examined the influence of home and school environments on pupils learning in primary schools in Akwanga metropolis. The study adopted survey research design. The study was conducted in Akwanga metropolis of Akwanga Local Government Area in Nasarawa State. The population for the study consisted of 60 parents and 100 primary school teachers in the study area. Two research questions guided the study. The data collection instruments were a 10-item structured questionnaire for parents on learning materials available for the child at home and a 16- items structured questionnaire for the teachers, which described conditions of the classrooms. The researcher also used observation method to study the actual conditions of the classrooms. The instruments were validated by three experts in the Department of Educational Psychology, Nasarawa State University, Keffi and administered with the help of two research assistants to 160 respondents randomly sampled from 16 primary schools in Akwanga metropolis. The reliability of the instrument was established using Test-Retest method and yielded a coefficient of 0.85. The data were collected and analyzed using frequency and percentage. The study found out that both the home and school environments were not learning inducing. It was found out that several educational materials needed to enhance learning were absent, both in home and classrooms. The study therefore recommended that concerted effort were needed to improve the present situation if the Basic Education Programme is to succeed in Nasarawa State.*

**Keywords:** Influence, Home environment, School environment, Primary school, Akwanga metropolis

**Introduction**

Primary education is universally accepted as basic human right embodied in numerous human right treaties. Notable among these are:-The organization of African charter on basic human right of 1963, which placed emphasis on primary education as a tool for development; The 1990 Jomtien on ‘’ Education for all: which resolved that by the year 2000, at least 80 percent of primary school age children should have attended and completed primary education. The world summit for children in 1990, the 1994 international conference on population and Development and the world summit for social Development in 1995 reaffirmed this goal. The Nigeria government has over the years made concerted effort to adhere to these international declarations realizing that development of the nation depend significantly on a sound education, the foundation of which is primary education,(Agum,2013); Rights of the children which indicated that the child has a right to education and the state, must ensure both a free and compulsory primary education.

The actual learning which the pupils go through should be a matter of concern to all. There have been comments and criticisms regarding the standard of education pupils receive, particularly in public primary schools in the country. Okoro (2010) confirmed that there is ample evidence of poor performance of pupils as they come up in the primary schools. The major factors responsible for this include pupils’ absenteeism from school and constant teachers’ strike. . No remedial or supplementary teaching is done to make up for lost time, and absence do not receive official attention. There is often inadequate and under achievement In addition to these is the environment which pupils learn. The pupil’s learning is enhanced or hindered by environmental factor.

Educationists often call for the provision of a proper climate’’ for the child’s learning environment, by this they mean that all aspects of the learning environment should be carefully planned to enhance learning. From psychological point of view, it is possible to see the learning promoting environment as positive in many ways and the learning inhibiting climate as negative (Ingram and Worrall 2013). Great educators such as Comenius and Dewey underlined the important role that the environment plays in the education of a child. Learning takes places through the environment in which the child is placed. The home (parent) and school (teacher) ought to be concern with providing environmental nutrients to maximize the child education development. What opportunity do home provide to induce the child’s learning? Is the school environment so structured as to enhance pupils’ intellectual development? The study reported here ought to provide answers to these questions.

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The study attempted to answer the following questions:

1. What are the learning inducing materials provided in the home for the child?
2. What are the learning facilities/activities presently in the classroom?

The learning environment is a vital part of the education system. It is all the influences that surround the child that causes him to be interested in learning (Ibiwoye, 2008 Dubey and Ndagi, 2009 and Dewsbury, 2010). In considering the learning environment, one should include the home, the classroom, the materials for teaching and learning, the pupils and the teacher himself as a major factor in the child’s education. The best learning environment can be described as one where the presence of all these elements allows the child to perform his/her learning tasks to the best of his/her abilities with minimum strain and maximum economy. Kaide, (2013) indicated that the learner will learn effectively from any medium if the learning conditions are appropriate. Literature reveals that there is substantial body of research findings on how isolated aspect of the physical environment such as light, temperature and sounds affects human beings, Myriad and Osen, (2009), Lee and Chang, (2010), Lugg and Batty, (2011). Ombugus, (2010), carried out a study of the learning environment in Akwanga Local Government Education Authority Schools. The study identified the following problems: a wide of class size, lack of teaching and learning aids, acute shortage of furniture, poor visual learning environment as result of constant closure of windows to keep off strong winds (there were no artificial light in the class rooms of the study),and poor conditions of buildings. Unfortunately 4 years after the study reported above, the situation has not greatly improved. It is even grown worse as revealed in Osoro, (2014) in a study, Management of infrastructure in selected primary schools in Akwanga L.G.A. The author painted a very dismal picture of the current situation in public primary schools when he reported that the schools were deficient in basic infrastructural facilities that make learning conducive such as access roads, buildings, classroom, furniture, toilets and so on. Many of the classrooms had no window cover, door lids and ceilings. The environment is literacy aggressive because the first impression is that of degeneration and decay, which is not an attribute of what effective literacy development, is. Audu and Kagbu, (2014) in their study, the effects of home environment on primary school pupils in selected L. G. As in Nasarawa State aptly called the present day public primary schools that form rightly 75% of the Nigeria primary schools’a breeding ground for illiteracy.’’

The environment has a great impact on teaching at any level of education, particularly at the primary level that is considered the foundation of other levels. However, some educators observed that when children are too comfortable they become drowsy and inattentive, others noted that children get tired and disinterested when there are extremely uncomfortable (Lee and Chagg, 2010; Ajala and Gloria 2010).

It is important to note that children need variety of space in the classroom for the diverse activities which they participate in. Crowded classroom conditions have a negative influence on teaching and learning. Recent studies Osoro (2014) and Agum (2013) provide evidence that high carbon dioxide level in class room can impair a child’s educational performance and learning activities. Similarly comfortable seats will promote correct posture and help to maintain ease for learning activities such as writing, reading and other creative tasks. According to Ajayi,(2014),it is generally agreed that most learning come through the sense of vision, a proper teaching environment should take into account that, that is necessary for efficient and comfortable seeing. Display and bulletin boards add color and beauty to the class room and should be placed at heights that are convenient for the pupils to see. Others too many for detailed analysis, are the weather, the instructional materials, the teacher, the home learning inducing materials as well as the pupils.

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**Methodology**

The research design used in the study was descriptive survey. The area of study is Akwanga Metropolis in Akwanga L.G.A in Nasarawa State, Nigeria.

Twenty public and twelve registered private schools are in the study area. A random sampling technique was used to select 10 pupils in public primary schools, 6 in private primary schools. Random sampling technique was also used to select 10 teachers in each school making a total of 100 teachers and 60 parents. These parents have children in the sampled schools.

The instruments for the study were in two sets. The parent questionnaires which contained 10 items on the kind of learning inducing materials provided in the home for their children. The second set was the teacher questionnaire which consisted of 16 items on the condition of their classrooms. The researcher also used observation method to study the condition of the classroom in order to authentic information in the data collected through the teachers’ instrument.

Three lecturers in the Department of Educational Psychology, Nasarawa State University, Keffi were involved in the instrument validation. The validates were requested to face validate the instrument based on whether items were clearly stated, relevant and could elicit the right responses. Their inputs were used to reconstruct and update the instrument before administration.

The reliability of the instrument was established by using Test-Retest method. This requires two administration of the same test to the same group of individuals and correlation coefficient calculated using Pearson’s product moment correlation. The analysis yielded coefficient of 0.85 which was considered high enough.

The researcher and two research assistants visited the schools and administered the instrument to the respondents in the sampled schools. They also went round the class rooms to look and observe the exact conditions of the classrooms. The data collected were analyzed to answer the research questions of the study. The research questions were analyzed using frequency and percentage. This is done to determine the degree of agreement or disagreement to each of the item. Any learning item with available value of less than 70 percent is considered not available, Simpson, 1972 in (Okeme, 2013).

**Results**

**Research Question 1**

What are the learning inducing materials provided in the home for the child?

**Table 1:** Frequency and percentage scores of the learning inducing materials provided in the home for the child N=60.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Items** | **Available**  **F %** | **Not available**  **F %** |
| 1. | Radio | 50 83.33 | 10 16.67 |
| 2. | Television | 54 90 | 6 10 |
| 3. | Computer | 9 15 | 51 85 |
| 4. | Newspaper | 28 46.67 | 32 53.33 |
| 5.  ***Aliyu Ebini Kana*** | Writing chair/table for children use | 12 20 | 48 80 |
| 6. | Chart on walls | 33 55 | 27 45 |
| 7a. | Caption | 13 21.67 | 47 78.33 |
| b. | Bottle tops to aid children’s numeracy skills | 29 48.33 | 31 51.33 |
| c. | Charts, pictures etc | 24 40 | 36 60 |
| 8a. | Children novels | 18 30 | 42 70 |
| b. | Maps | 30 50 | 30 50 |
| c. | Atlases | 18 40 | 36 60 |
| d. | Supplementary books | 19 33.3 | 41 66.7 |
| e. | Video tapes | 31 51.67 | 29 48.33 |
| f. | Educational films | 16 26.67 | 44 73.33 |
| g. | General interest films | 46 76.67 | 14 23.33 |
| 9. | Children rooms where literacy materials are displayed for their use | 22 36.67 | 38 63.33 |
| 10. | Play area where children engage in practices activities | 30 50 | 30 50 |

**Table 1** reveals that, all the eighteen items listed as learning inducing materials in the home had available percentages range from 15-83.33 and not available percentages between 10 and 85. This indicates that all the items are inducing learning materials in the home. The parents’ responses revealed that the home did not have appropriate and adequate provision of literacy inducing materials. Although a majority of parents had radio and television sets, they did not have any writing tables and chairs where they could comfortably study as indicated by 80% of parents. Other materials, which were of vital importance for children’s education such as captions, charts and pictures (item 7), children’s novels, supplementary books, films on educational matters (item 8) were not available in many of the homes. Such homes could be said to be bookless and literacy hostile. With respect to the regularity of visiting their children’s school to check on their progress, 42 (70%) of the parents indicated that they visited the school once in a term, 18 (30%) visited only on request by the head teacher or class teacher. When asked to indicate length of time child had to study at home daily, 28 (46.67%) indicated that the child spent one hour study, 12 (20%) indicated 2 hours, and 20 (33.33%) indicated that the length depended on the child himself/herself. When asked to indicate those who helped the child with homework or assignment at home, 42 (70%) cited older siblings, while 18 (30%) stated that a home teacher employed for the child helped the child.

**Research question 2**

What are the learning facilities/activities presently in the classroom?

**Table 2**: Teachers’ Responses on the present learning facilities/activities in the classroom N=100

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Item** | **Available**  **F** | **%** | **Not available**  **F** | **%** |
| 1. | Facilities in the class |  |  |  |  |
| a. | Writing desks and chair for each pupils | 34 | 34 | 66 | 66 |
| b. | Texts books | 43 | 43 | 57 | 57 |
| c. | Exercise books and other writing materials | 30.6 | 30.6 | 69.4 | 69.4 |
| 2. | Literacy inducing material |  |  |  |  |
| a. | Word charts | 32 | 32 | 68 | 68 |
| b. | Picture charts | 31 | 31 | 69 | 69 |
| 3. | Numeracy inducing materials |  |  |  |  |
| a. | Number charts | 24 | 24 | 76 | 76 |
| b. | Lexicons such as: +, <, >, -, X | 28 | 28 | 72 | 72 |
| 4. | Wall charts | 35 | 35 | 65 | 65 |
| 5. | Purposeful utilization of the 4 corners of the classroom | 15 | 15 | 85 | 85 |
| 6. | Children’s work display area | 22 | 22 | 78 | 78 |
| 7.  ***Aliyu Ebini Kana*** | Radio in the classroom |  |  | 100 | 100 |
| 8. | Television in the classroom | 4 | 4 | 96 | 96 |
| 9. | Computer in the school | 7 | 7 | 93 | 93 |
| 10. | Discovery table in the school | 13 | 13 | 87 | 87 |
| 11. | Table & chair for teacher’s use | 46 | 46 | 54 | 54 |
| 12. | Cupboard for storage of instructional materials for class use | 26 | 26 | 74 | 74 |
| 13. | The classroom |  |  |  |  |
| a. | Is well ventilated | 40 | 40 | 60 | 60 |
| b. | Is attractive | 3 | 3 | 97 | 97 |
| c. | Has plastered and painted walls | 42 | 42 | 58 | 58 |
| d. | Has floor that is neatly plastered | 31 | 31 | 69 | 69 |
| e. | Has window lids | 38 | 38 | 62 | 62 |
| f. | Has door covers | 46 | 46 | 54 | 54 |
| 14. | Method of teaching used |  |  |  |  |
| a. | Lecture method | 73 | 73 | 27 | 27 |
| b. | Discussion method | 60 | 60 | 40 | 40 |
| c. | Role play | 13 | 13 | 87 | 87 |
| d. | Group work | 20 | 20 | 80 | 80 |
| 15. | Evaluation of pupils’ work is done through |  |  |  |  |
| a. | Home work/assignment | 79 | 79 | 21 | 21 |
| b. | Quiz | 37 | 37 | 63 | 63 |
| c. | Test | 50 | 50 | 50 | 50 |
| d. | Individual project | 29 | 29 | 69 | 69 |
| e. | Group project | 39 | 39 | 61 | 61 |
| f. | Examination | 100 | 100 | - |  |

The datapresented in Table **2** shows that the thirty two listed items are classroom facilities and activities needed for effective learning, but most of them had low percentage of availability. The percentage score on whether the items are available show a range between 3% (i.e. Is the classroom attractive) and 79% (Homework/assignment). For the same items, the percentage scores on non- availability, the items had 97% and 21% respectively. The percentage of the listed learning facilities available ranged between 3% and 79%, while the percentage of the items not available is between 21% and 100%. The 32 classroom learning facilities and activities are important but were not adequately available.

The teachers were asked to identify the features of learner-friendly classroom. The list that emerged is as follow:

* Clean, tidy and well ventilated room.
* Room has sufficient space and lights
* Pupils have desks (tables and chairs).
* Pupils have textbooks and writing materials.
* Comfortable sitting arrangement.
* Class decorated with learning inducing material such as; reading corner, science corner, home corner, shopping corner, amusement corner.
* Cordial pupil-pupil rapport.
* Dedication and hard work on part of the teachers.
* Diversified teaching methods are used.
* Pupils learn more through practical activities.
* Good chalk board.

**Discussion**

From the findings, environment of primary school pupils is clearly poor and not learner friendly. The physical condition of the home and class rooms is not conducive for pupils learning. Pupils do not have seats and tables to write on. This may make pupils bored, restless and even lose interest in learning. These findings were in agreement with those of Agum 2013 and Ajayi (2014) that the learner will learn effectively from any medium if the learning environment is conducive.This study asserted that the child’s environment (home and classroom) affects learning and emphasizes that the comfort of the child is important if parents and teachers are to maximize their efforts and economize energy. To achieve this, there is the need for good seating arrangement, provision of materials and appropriate viewing conditions.

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Adequate spaces, noise control, correct room temperature, among others are of great importance in enhancing the child’s learning. Pupils themselves can and should participate more in their own learning through the use of practical activity teaching-learning method. Class room lessons should become livelier and be backed up with educational programmes through the radio, television and other electronic media. A culturally friendly version of the television series “Sesame Street” should be developed and used as a package for the Basic Education Programme. Infant method of teaching approach should be introduced as a compulsory course in the Nigeria Certificate in Education (NCE) programme to ensure that all NCE teachers are armed with the skills of teaching lower primary classes. Class teaching particularly at this level should be done by lesson demonstration involving activities and not by the lecture method.The primary education programme will be assessed to be a success only when its products are literate, skilled and productive members of the society.

**Conclusion**

Based on the findings of the study, it could be concluded that there are inadequate provisions of learning materials and facilities in both homes and classrooms in primary schools in Nasarawa State. Examination as an academic activity seems to be the most important item in primary schools in the study area. The home and classroom inducing learning materials are basic and important for effective learning at the primary level of education. There is therefore the need for provision of adequate learning materials in homes and primary schools for effective learning by the pupils.

**Recommendations**

1. Government Education Resource Centre should assist teachers in preparation of classroom instructional materials.
2. Government should launch a frontal attack on the problems of the quality of learning in our primary schools to ensure the success of the Basic Education Programme.

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**INITIATIVES FOR ENHANCING THE INTEREST OF BUSINESS EDUCATORS IN INCORPORATING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) INTO BUSINESS EDUCATION PROGRAMME**

**BY**

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**Abstract**

*The study sought to determine initiatives for enhancing the interest of business educators in incorporating information and Communication Technology (ICT) into Business Education Programme. The population for this study consisted of 110 business educators. No sampling was made because of the relative small size of the population. Data were analyzed through the use of mean and standard deviation. The findings of the study revealed that business educators’ interest in incorporating ICT into Business Education Programme could be enhanced through enhancing the interest of business educators in: adopting ICT based pedagogy in teaching; and identifying with ICT driven Business Education Programme. It was recommended that the findings of this study be utilized to enhance the interest of business educators in incorporating ICT into Business Education Programme.*

**Keywords:** Training, Technology, Pedagogy, Internet, Incorporation, and Communication.

**Introduction**

Business educators are very essential human resource in implementing the Information and Communication Technology (ICT) driven education in Nigeria, in the 21st century. This is due to the fact that business educators are highly instrumental in both human and economic development. Ugokwe (2011) emphasized the necessity for pre-service professional development opportunities for Business Educators to enable them live up to the above obligation.

A business educator is a professional teacher of business who is constantly aware of the state of the art in Business Education. This is to say that a business educator is any person who: plays the critical role in making business education viable and visible in the community; plays the role of agent of change in business education; delivers high-quality business education programmes that are equal to any academic offering in the school system, and he that is able to identify problems facing learning and teaching in Business Education subjects, and is able to speculate solution to these problems (Osuala, 2009). For the purpose of this work, a business educator, is a person who is knowledgeable in the six components of courses that make up Business Education Programme. The six courses include: General education component; General business subjects component; Secretarial component; Marketing and Distribution subjects component; Professional educational component; and Accounting as well as Teaching Practice and Industrial Work Experience (Osuala, 2009).The business educator in the author’s mind is one who accomplishes all the above obligations and is conversant with applications of ICT. There are both male and female business educators.

The advent of ICT has transformed the society, business and industries. There is need to integrate ICT into the classroom to better equip students for the global economy in the 21stcentury. Lyman and Varian (2015) stated that no country’s system of education round the globe has been able to keep pace with the changes occasioned by the level of advancement in ICT. This is a pointer that strong in-service support for business educators should be meticulously carried out. The authors concluded that no amount of workshops would be enough to successfully integrate ICT into Business Education. According to the authors in-service training programmes systematically planned and structured to be effective remain the best bait. Redmann and Kofrilk, (2012) also stated that in-service training should be organized from time to time for business educators, to enable them incorporate ICT effectively in their teachings.

The feasibility of performing various tasks in the Internet driven classroom will be consequent upon coming up with initiatives for keeping pace with ICT revolution (Reigeluth & Joseph, 2015). According to Lewis, Hodge, Gamage, and Whittaker (2012) some initiatives such as ICT oriented in-service and pre-service professional development opportunities have placed pre-eminence of the academic ability of both business educators and all the people of various academic specialization. The authors are of the view that institutions that support initiatives for enhancing the use of ICT in Business Education Programme expect to benefit from having business educators with greater skills and deeper expertise. Initiatives in Business Education can include in-house training, tuition assistance, or policies that make it easier for business educators to take continuing education classes (Ellis, McNicholl & Pendry, 2012). Initiatives, in this work, refer to sponsoring ICT based programmes that offer training or continuing education to business educators, or help them plan their own professional growth (Ellis, McNicholl & Pendry, 2012).

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Business Education is a two dimensional programme of instruction, viz: Office Education, and General Business Education. Office Education is a vocational education programme meant to equip careers with employability skills and also to enable them advance in office occupations, through initial, refresher and upgrading education. General business education on the other hand, is a programme to furnish students with information and capabilities necessary for all to be able to manage their individual businesses and in harnessing the services of the business world (Osuala, 2009). Business Education, for the purpose of this work is an education for and about business, that combines both theoretical and practical knowledge, to expose the recipient to the economic system of his society, and equip him with lifelong skills that would enable him to make intelligent judgment as a producer, employee or consumer of goods and services.Both public and private universities run Business Education Programme, in this ICT era.

Information and Communication Technology (ICT) refers to forms of technology that are used to transmit, store, create, share or exchange information (Agbo, 2009). As explained by Mailer in Agbo (2009) all the range of technologies, used in processing information and electronic communication, are known as Information and Communication Technology (ICT). Included in this group are: the radio, television, videos, computers, sensors, interface boxes, e-mail, satellite connection, Internet and the softwares and materials which are employed by business educators in their teaching and learning practice. In this work, ICT is defined as another/extentional term for Information Technology (IT) that stresses the role of unified communication and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information (Sarkar, 2012). The findings of this study would be useful to students of Business Education who would be better equipped for the world of work.

**Statement of the Problem**

ICT compliance is one of the basic prerequisites for business educators to learn and teach students, in line with the ICT driven education of the 21st century (Lewis, Hodge, Gamage & Whittaker, 2012). Many business educators lack the interest in applying ICT in teaching and learning and therefore, lack proficiency in computer manipulations, such as ability to save data in the flash drive, floppy disk or CD for record keeping (Achugbue, 2011). Achugbue further stated that business educators are not keen to embrace ICT based pedagogy in teaching because: ICT based instruction is immensely expensive; methodologies in ICT based teaching are insufficient; use of ICT in teaching results in waste of valuable time; and adoption of ICT in teaching could misguide the lecturers, due to wrong information. Hence, Achugbue concluded, business educators are consequently neither interested in delivering online lectures nor are they interested in giving soft copies of lecture information to students.

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The fact that business educators need ICT literacy to be more productive notwithstanding, a good number of business educators have neither adopted ICT based pedagogy in their teaching nor gotten interested in identifying with ICT driven Business Education Programme, that would enhance their efficiency. Above all, there are hardly ICT based in-service training programme for business educators in Nigerian Universities to enhance the business educators’ interest in synergizing ICT with teaching and learning (Ugokwe, 2011). This is evident in lukewarmness of many business educators in believing ICT compatible with Business Education because of its pace of change, which no academic programme can withstand (Achugbue, 2011). This results in producing graduates that do not meet the demand of the nowadays job market, thereby worsening the unemployment situation in the country. Hence, the need to determine initiatives for enhancing the interest of business educators in incorporating ICT into Business Education Programme.

**Purpose of the Study**

The major purpose of this study was to determine initiatives for enhancing the interest of business educators in incorporating ICT into Business Education Progrmme. Specifically, the study sought to:

1. Determine initiatives for enhancing the interest of business educators in adopting ICT based pedagogy in teaching.
2. determine initiatives for enhancing the interest of business educators in identifying with ICT driven Business Education Programme

**Research Questions**

The study answered the following research questions:

1. What are initiatives for enhancing the interest of business educators in adopting ICT based pedagogy in teaching?
2. What are initiatives for enhancing the interest of business educators in identifying with ICT driven Business Education Programme?

**Hypotheses**

1. There is no significant difference in the mean ratings of the responses of male and female business educators on initiatives that could enhance the interest of business educators in adopting ICT based pedagogy in teaching.
2. There is no significant difference in the mean ratings of the responses of business educators in public and private universities on initiatives that could enhance the interest of business educators in identifying with ICT based Business Education Programme.

**Methodology**

This study was conducted using the survey research design. Osuala in Anaele and Abiodun (2009) pointed out that survey research focuses on people, their vital facts, beliefs, opinions, attitudes, motivations and behaviour, taking into consideration the present prevailing situations, where no variable were manipulated as obtainable in experimental design. The design is suitable for the study because it uses questionnaire to seek information from respondents. The study was conducted in all public and private universities offering Business Education in Lagos and Ogun States only. No attempt was made to carry out the study in any other universities in other states of Nigeria. Hence, the area of the study was Lagos and Ogun States. The population for the study comprised 110 business educators in 5 universities in Lagos and Ogun States. No sampling was carried out since the population was of manageable size.

The instrument for data collection was questionnaire. The questionnaire was developed after review of available literature on prospects of development in ICT. The instrument was face-validated by three lecturers in the Department of Business Education University of Nigeria, Nsukka, and two lecturers in the Department of Business Education, Nnamdi Azikiwe University, Awka. The reliability of the instrument was established using Cronbach Alpha Reliability technique. The result of the reliability coefficient was 0.96.

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The data collected were analyzed using the mean and standard deviation for answering the research questions while t-test statistic was used to test the hypothesis at 0.05 level of significance. The following discussions guided the interpretation of the results of analysis made:

1. Any item with a mean value of 2.50 and above indicated that the respondents agreed that the item was an initiative while any time with a mean below 2.50 indicated that the respondents did not agree that it is an initiative.
2. The hypothesis of no significant difference (HO) was upheld for any item whose t-calculated value is less than the t-table value of 1.96 at probability of 0.05 level of significance and 109 degree of freedom. In the alternative, the hypothesis of no significant difference was rejected for any item whose t-calculated value was higher than the t-table value at probability of 0.05 level of significance.

**Results**

The results of the study were obtained from the research questions answered and the hypothesis tested.

**Research Question 1**

What are initiatives for enhancing the interest of business educators in adopting ICT based pedagogy in teaching?

**Hypothesis 1**

There is no significant difference in the mean ratings of the responses of male and female business educators on initiatives that could enhance the interest of business educators in adopting ICT based pedagogy in teaching.

**Table 1:** Mean Ratings, Standard Deviations and t-test Analysis of the Responses of Male and Female Business Educators on Initiatives that could enhance the Interest of Business Educators in Adopting ICT Based Pedagogy in Teaching.

**N = 100**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** |  | **SD** | **t-cal** | **t-tab** | **Remarks**  **RQ HO** | |
|  | Use storytelling and questioning technique to communicate to business educators that ICT helps to reduce the social disparities between students since they work in teams to achieve a given task. | 2.94 | 0.71 | 0.41 | 1.96 | A | NS |
|  | Inform business educators that they assume responsibility when they use ICT to organize their work through digital portfolios or projects. | 2.77 | 0.86 | 0.50 | 1.96 | A | NS |
|  | Indicate through some written examples that ICT would create significant impact on business educators and lecturing process | 3.56 | 0.52 | 1.36 | 1.96 | A | NS |
|  | Communicate to business educators that majority of business educators in Europe (90%) use ICT to do tasks such as preparing lecturers, sequencing classroom activities, etc. | 3.57 | 0.55 | 0.79 | 1.96 | A | NS |
|  | Use jingles with focus on ICT to emphasize that business educators could plan their lecturers more efficiently using ICT. | 3.48 | 0.60 | 1.20 | 1.96 | A | NS |
|  | Organize film and video shows to portray that ICT would help business educators to work in a team and share ideas related to course curriculum. | 3.43 | 0.65 | 0.97 | 1.96 | A | NS |
|  | Organize business educators into clubs to spread the information about evidence that broadband and interactive white boards play a central role in fostering business educators’ communication and increasing collaboration between educators.  ***Solomon Uchenna Agbo*** | 3.31 | 0.78 | 1.23 | 1.96 | A | NS |
|  | Organize excursion among business educators to provide an evidence that many people use ICT to support innovative pedagogy. | 3.28 | 0.77 | 1.17 | 1.96 | A | NS |
|  | Demonstrate to business educators how ICT can improve lecturing by enhancing an already practiced knowledge and introducing new ways of teaching and learning. | 3.50 | 0.70 | 1.41 | 1.96 | A | NS |
|  | Inform business educators that change that takes full advantage of ICT will only happen slowly over time, and only if business educators continue to experiment with new approaches. | 3.59 | 0.65 | 0.82 | 1.96 | A | NS |
|  | Creates greater awareness to enable business educators fully embrace ICT and use it in education. | 3.45 | 0.71 | 1.40 | 1.96 | A | NS |
|  | Develop simulation games on the need for ICT in education for business educators to play and build interest. | 3.58 | 0.68 | 1.38 | 1.96 | A | NS |
|  | Motivate business educators with material rewards when an exceptional use of ICT is made in education. | 3.61 | 0.72 | 1.16 | 1.96 | A | NS |
|  | **Cluster mean** | **3.40** |  |  |  | **A** |  |

Data in Table 1 showed that the 13 initiative items had their mean ranged from 2.77 to 3.61. This indicated that their mean were above the cutoff point of 2.50. The observation implies that the items were initiatives that could enhance the interest of business educators in adopting ICT based pedagogy in teaching. The standard deviation ranged from 0.52 to 0.86 indicating that respondents were not too far from the mean and from one another in their responses.

Data presented in Table 1 also revealed that 13 items have their calculated t-values ranged from 0.41 to 1.41 which were less than t-table value of 1.96 at 0.05 level of significance and 109 degrees of freedom. This indicated that there is no significant difference in the mean ratings of the responses of the groups of respondents on 13 initiatives that could enhance the interest of business educators in adopting ICT based pedagogy in teaching. With this result, the null hypothesis of no significance was upheld for the 13 items.

**Research Question 2**

What are initiatives for enhancing the interest of business educators in identifying with ICT driven Business Education Programme?

**Hypothesis 2**

There is no significant difference in the mean ratings of the responses of business educators in public and private universities on initiatives that could enhance the interest of business educators in identifying with ICT driven Business Education Programme.

The data for answering research question 2 and testing hypothesis 2 were presented in Table two.

**Table 2:** Mean Ratings, Standard Deviations and t-test Analysis of the Responses of Business Educators in public and private universities on Initiatives that could enhance the Interest of Business Educators in identifying with ICT driven Business Education Programme.

**N = 100**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** |  | **SD** | **t-cal** | **t-tab** | **Remarks**  **RQ HO** | |
|  | Enumerate the positive impacts of ICT on teaching. | 3.34 | 0.77 | 0.97 | 1.96 | A | NS |
|  | Motivate business educators to enhance their use of ICT to support traditional learning methods. | 3.56 | 0.71 | 1.44 | 1.96 | A | NS |
|  | Make the ability to use ICT to change the lecturer’s pace in teaching a competition among business educators. | 3.63 | 0.65 | 0.96 | 1.96 | A | NS |
|  | Appoint a committee to regularly provide proof that new technologies have lots of benefits on the students. | 3.41 | 0.88 | 1.06 | 1.96 | A | NS |
|  | Reward business educators’ efforts towards higher quality lessons through the use of ICT in collaboration to plan and prepare resources. | 3.55 | 0.57 | 1.00 | 1.96 | A | NS |
|  | Demonstrate new skills that students learn through the use of ICT: analytical, including improvements in reading comprehension.  ***Solomon Uchenna Agbo*** | 2.64 | 0.95 | 0.31 | 1.96 | A | NS |
|  | Organize seminar for business educators to emphasize that ICT develops some writings skills: Spelling, grammar, punctuation, editing and re-drafting. | 3.42 | 0.61 | 1.41 | 1.96 | A | NS |
|  | Request business educators to write report individually on how ICT encourages independent and active learning. | 2.83 | 0.66 | 0.51 | 1.96 | A | NS |
|  | Access the level of success among business educators who used ICT and return feedback to them. | 3.50 | 0.59 | 0.95 | 1.96 | A | NS |
|  | Reward business educators accordingly based on their inclination to use ICT in instruction delivery. | 3.29 | 0.71 | 0.12 | 1.96 | A | NS |
|  | **Cluster mean** | **3.32** |  | **0.71** |  | **A** |  |

Data in Table 2 showed that the 10 initiative items had their means ranged from 2.64 to 3.63. This indicated that their means were above the cut off point of 2.50. The observation implies that all the 10 items were initiatives that could enhance the interest of business educators in identifying with ICT driven Business Education Programme. The standard deviation of the 10 items ranged from 0.57 to 0.95 indicating that the respondents were not too far from the mean and from one another in their responses.

Data presented in Table 2 also revealed that 10 items had their calculated t-values ranged from 0.12 to 1.44 which were less than the t-table value of 1.96 at 0.05 level of significance and 109 degrees of freedom. This indicated that there is no significant different in the mean ratings of the responses of the two groups of respondents on the 10 initiatives that could enhance the interest of business educators in identifying with ICT driven Business Education Programme. With this result, the null hypothesis of no significant difference was upheld for the 10 items.

**Discussion of Result**

The result of the study revealed that business educators agreed that the twenty three (23) initiatives could be used to enhance the interest of business educators in incorporating ICT into Business Education Programme through enhancing the interest of business educators in: adopting ICT based pedagogy in teaching; and identify with ICT driven Business Education Programme. The result of this study is in conformity with the opinion of Ugokwe (2011) who stressed the need for enhancing business educators’ interest about ICT based instruction delivery in Nigerian universities. The author found out that business educators’ interest in incorporating ICT into Business Education Programme could be enhanced through enhancing the interest of business educators in: adopting ICT based pedagogy in teaching; and identifying with ICT driven Business Education Programme. The result of this study agrees with the submission of Sarkar (2012) who developed the adoption process initiative model made up of awareness, interest, decision making, clarification adoption, and satisfaction used for encouraging business educators to imbibe and stick to ICT based teaching and learning.

The findings of the study from the test of hypotheses further indicated that there was no significant difference in the responses of both male and female business educators, and business educators in public and private universities in the 23 initiatives that could enhance the interest of business educators in incorporating ICT into Business Education Programme. The implication of this finding is that it helped to validate the questions raised and answered by this study. It also revealed that the work experience of the two groups of respondents did not significantly influence their perception on enhancement initiatives identified in this study.

**Conclusion**

The interest of business educators in incorporating ICT into Business Education Programme could be enhanced through enhancing the interest of business educators in: adopting ICT based pedagogy in teaching; and identifying with ICT driven Business Education Programme.

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**Recommendation**

Based on the findings made and conclusions drawn from the study, it was recommended that the findings of the study be utilized to enhance the interest of business educators in incorporating ICT into Business Education Programme.

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**OPPORTUNITIES IN THE EDUCATIONAL SECTOR FOR ECONOMIC DIVERSIFICATION**

**BY**

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**Abstract**

*This study focused on improving quality education as a gateway to diversify the economy. The study was a survey research conducted in Gombe, Borno and Adamawa states Metropolitans that is Gombe, Maiduguri and Yola respectively. The sample of the study was 1800 respondents, which comprises of 300 respondents from upper social class, 900 middle social class and 600 lower social class. The instrument for data collection was a 5-point questionnaire designed by the researchers and validated by three experts from the Modibbo Adama University of Technology, Yola. A test was done on 40 respondents from Biu and Mubi. Test re-test reliability was used in the trial test. Cronbach Alpha was used to determine the reliability coefficients. A reliability coefficient of 0.79 was realized. Two research questions were raised to guide the study, while 2 null hypotheses were formulated and tested at 0.05 levels of significance. Mean and standard deviation were used to answer the research questions; and Analysis of Variance (ANOVA) was used to test the null hypotheses, while Scheffe test was used to show which group brings about the significant difference in the groups. The findings revealed that all the items are opportunities for economic diversification in educational sector. Also, the finding revealed that improving quality education, as gateway to diversifying the economy will improve the performance of other sectors of the economy. The study recommended among others that, an enabling environment should be provided for investor to invest in education sector.*

**Keywords:** Opportunities, Economic diversification, Educational sector, Gateway

**Introduction**

The global economy has evolved into a knowledge based economy, where skills and human resources have become the driving force for innovation, continued growth and corporate competitive advantage. But, Crude oil accounts for more than 94 percent of Nigeria’s [exports](http://documents.worldbank.org/curated/en/684961468197340692/pdf/101751-WP-P151987-Box393265B-PUBLIC-Nigeria-Economic-Report-2015-web-version.pdf) and 70 percent of its government revenues (Federal Republic of Nigeria, 2017). A sharp decline in crude oil prices in recent years put Nigeria into a [recession](http://www.bbc.com/news/business-37228741). This added to the existing country’s long problems of the violent [Boko Haram](https://www.nytimes.com/2017/02/28/world/africa/nigeria-civilian-massacre.html) insurgency, [pervasive corruption](http://www.economist.com/blogs/economist-explains/2016/07/economist-explains-13). The country also faces challenges that are common to Sub-Saharan Africa. These challenges include high level of illiteracy, low life expectancy and poor public health systems and income inequalities among others.

Despite these constraints, the country educational sector still remains a dynamic growing market. This is largely because of the strong population growth and the demand for quality education. According to the report from World Education news and report 2017, 60% of the Nigerian populations are youth under the age of 24. Although, the rapid expansion of the nation’s higher education sector in recent decades has failed to accommodate growing demand of students for higher education. Hence, more than two thirds of applicants who sat for the country’s Joint Admission and Matriculation Board (JAMB) examination could not secure admission into Nigerian universities and other tertiary institutions.

In line with the above, economic diversification is a strategy to transform the economy from using a single source to multiple sources of income spread over primary, secondary and tertiary sectors, involving large sections of the population (United Nation, 2016). The objective of economic diversification according to the United Nation is to improve economic performance for achieving sustainable growth building resilience against fluctuating economic activity and reducing vulnerability to income loss due to volatility of product price on the international market, thereby creating job opportunities and alleviating poverty. Economic diversification contributes positively to economic performance and sustainable growth policy (Francis, 2016). Therefore, understanding the impact of economic performance on labour market, employment generation, export growth and other sustainable development are determinants driving economic diversification.

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Education remains a substantial economic engine to drive economic growth; it creates a vital avenue of opportunity for economic diversifications (Francis, 2016). There is high demand on quality education; one way of diversifying our economy is through sound investment in educational sector of the economy (Fagge, 2016). Investing in this sector of the economy will generates huge return to the country’s coffers. If Nigerian universities and colleges are properly funded, well manage and equip with state-of-the-art research facilities and engage in innovative research of international value, then education will be viable to serve as a financial base for the nation’s economy growth. Looking at what Nigeria is facing today and what she will likely face in the future; calls for diversification of the economy. If Nigeria invest well and improve quality of education system, it will transform and develop human resource needs of the society. It will also raise internally generated revenue through returns on tuition fees paid by students. Besides, educational institutions will be in position to attract foreign students most especially from Africa. Consequently, tuition fees and huge sums of money that runs in billions of naira to capital flight from Nigeria to other countries can be retained in the country (World Education news and report, 2017).

Given the rapid growth and demand in quality education, private investment in education, laboratory equipment, books, and professional textbooks will continue to gain market position (Omoetteh, 2016).  Billions of Naira lost due to capital flight going abroad will be saved. Besides, quality education will attract foreign students, there by boasting transport and aviation sector, as mobility of foreign students will bring more capital flight to the nation’s coffers.

Moreover, professionals and exam bodies such as Joint Admission and Matriculation Board (JAMB), National Examination Council (NECO) and National Business, Technical Examination Board (NABTEB), Institutes of Charted Accountants (ICAN) and so forth are windows of opportunities that can generate returns to government coffers. These professional and exams bodies registered millions of candidates annually (Chiejina, 2015). JAMB alone saved N8 billion into the federation coffers in 2017. If JAMB can generate huge amount of money, then more revenue can be generated from exam bodies such as NECO, NABTEB and other professional bodies.

Government commitment on quality education is way of revitalising educational institutions to produce quality products to meet the nation’s human resource demand and or to create jobs to the youths. This sector alone can catapult the nation’s economy and end the economic recession. This paper therefore, focused on improving the quality of education a gateway to diversification of the economy.

**Purpose of the study**

The main purpose of the study is, to determine the opportunities in educational sector for economic diversification can be used as a gateway to diversification of the economy. Specifically, the study seeks to:

1. Determine the opportunities in educational sector that attracts economic diversification
2. Determine the perceived impact of economic diversification on quality of education on other sectors of the economy.

**Research Questions**

1. What are the opportunities in educational sector that attracts economic diversification?
2. What perceived impact does economic diversification has on education and other sectors of the economy?

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**Hypotheses**

H01:There is no significant difference in the mean responses of low, middle and upper social class on the opportunities in educational sector that attracts economic diversification.

H02:There is no significant difference in the mean responses of low, middle and upper social class on the perceived impact economic diversification has on education and other sectors of the economy.

**Methodology**

The design for this study was descriptive survey research design. The study covered Gombe, Maiduguri and Yola Metropolitans i.e Gombe, Borno and Adamawa states respectively. The sample of the study was 1800 respondents. The sample consisted of 300 respondents from upper social class, 900 middle social class and 600 lower social class, drawn from the people in the three states, using purposive sampling technique respectively, that reside in strategic locations in the metropolitan capital of Adamawa, Borno and Gombe states. The instrument for data collection was a questionnaire structured on 4-points scale. The instrument consisted of 14 items. The instrument was a structured questionnaire, validated by three specialists in the Department of Technology Education, Modibbo Adamawa University of Technology. To obtain reliability coefficient of the instrument, the validate copy was trial tested, using test re-test method of estimating reliability on 40 respondents in Biu and Mubi Local Government of Borno and Adamawa state respectively. The reliability coefficients realized using Cronbach Alpha was 0.79 and was found reliable. This is because, according to Iheamacho (1997) a reliability coefficient of 0.70 and above is reliable for a study. Mean and standard deviation were used to answer the research questions, while analysis of variance (ANOVA) was used to test the null hypotheses at 0.05 levels of significance. Any item with mean of 2.50 and above was considered agreed, while any item less than 2.50, was considered disagreed. On the other hand, if the calculated f-value is less than the critical value, the hypotheses is accepted, otherwise it is rejected if the calculated is higher than the critical value.

**RESULTS**

**Research Question1:** What opportunities in educational sector attract economic   
diversification?

**Table 1:** Mean and standard deviation of opportunities in educational sector that attracts   
economic diversification

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | **Opportunity in education sector** | **USC N=300** | **MSC N=900** | **LSC N=600** | **ItemN=1800** | **SDG** | **Remark** |
| 1 | Growing population of school age. | 2.58 | 2.93 | 3.51 | 3.07 | 1.00 | Agreed |
| 2 | Desire for quality education and training at all levels of education system. | 2.68 | 3.12 | 3.43 | 3.15 | 0.86 | Agreed |
| 3 | Continuing education and training. | 2.78 | 2.86 | 3.74 | 3.12 | 0.97 | Agreed |
| 4 | Professional development and training  **GRAND MEAN** | 2.67 | 3.11 | 3.34 | 3.47  **3.17** | 0.84  **0.92** | Agreed  **Agreed** |

**Key:** USC = mean of upper social class, MSC = mean of middle social class,

LSC = mean of lower social class

The data presented on table 1, revealed that the mean of the respondent on all the items were above the cut-off point of 2.50. This implies that the respondents on average agreed with all the items as opportunities in education sector. Hence, items one to four indicates the opportunity for economy diversification in educational sector. This is because, for instance all the respondents agreed to the desire for quality education and training in all levels of educational system.

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**Research question 2:** What impact does economic diversification on quality education  
would have on other sectors of the economics?

**Table 2:** Mean and standard deviation on the perceived impact economic diversification has on education and other sectors of the economy.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | **Impact of diversification of the economy on the growth of other sectors of the economy** | **USC N=300** | **MSC N=900** | **LSC N=600** | **ItemN=1800** | **SDG** | **Remark** |
| 5 | Diversification on quality education would raise market for laboratory equipment | 2.63 | 2.97 | 3.15 | 3.09 | 0.91 | Agreed |
| 6 | Diversification on quality education would raise market for stationery | 2.79 | 3.14 | 3.33 | 3.14 | 0.76 | Agreed |
| 7 | Diversification on quality education would raise market for professional textbooks | 2.89 | 2.98 | 3.50 | 3.11 | 0.94 | Agreed |
| 8 | Diversification on quality education would raise market for Furniture | 2.76 | 3.09 | 3.37 | 3.13 | 0.86 | Agreed |
| 9 | Diversification on quality education would raise market for educational consultants and training services | 2.62 | 2.92 | 3.51 | 3.07 | 0.99 | Agreed |
| 10 | Diversification on quality education would raise market for transport and aviation industries  **GRAND MEAN** | 2.73 | 3.15 | 3.43 | 3.17  **3.12** | 0.84  **0.88** | Agreed  **Agreed** |

**Key:** USC = Mean of upper social class,  MSC = Mean of middle social class,

LSC = Mean of lower class.

Table 2, indicated that, the respondents have agreed with the entire items presented on the table with item mean above the cut-off point of 2.50. This implies that diversification of economy in education will have impact on the growth of other sectors of the economy.

**Hypotheses 1:** There is no significant difference in the mean responses of low, middle and upper social class on the opportunities in educational sector that attracts economic diversification.

**Table 3**: Analysis of Variance (ANOVA) mean responses of low, middle and upper social class on the opportunities in educational sector that attracts economic diversification

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Item** |  | **Sum of Squares** | **df** | **F** | **Decision** | **Post hoc test (Scheffe)** |
| 1 | Growing population of school age. | Between Groups | 102.49 | 2  897  899 | 57.21 | S | 3.51 LSC |
| Within Groups | 803.51 |
| Total | 906.00 |
| 2 | Desire for quality education and training at all levels of education system. | Between Groups | 57.69 | 2  897  899 | 47.04 | S | 3.43 LSC |
| Within Groups | 60.1.6 |
| Total | 658.75 |
| 3 | Continuing education and training. | Between Groups | 116.21 | 2  897  899 | 58.11 | S | 3.47 |
| Within Groups  ***Medugu & Abubakar*** | 737.78 |
| Total | 853.99 |
| 4 | Professional development and training. | Between Groups | 58.69 | 2  897  899 | 45.18 | S | 3.33 |
| Within Groups | 582.65 |
| Total | 641.35 |

**Key:** USC= Upper Social Class, MSC= Middle Social Class, LSC = Lower Social Class,

df = Degree of freedom, F = Calculated value, S = Significant

The analysis on Table 3, revealed that at 0.05 level of significance, all the four items are significant, hence, the null hypothesis 1 was rejected. This implies that, there is significant differences in the mean responses of the respondents, which arose as the results of social class difference as showed by scheffe test, in this case, lower social class is the difference.

**Hypothesis 2:** There is no significant difference in the mean responses of low, middle and upper social class on the perceived impact economic diversification has on education and other sectors of the economy.

**Table 4**:Analysis of Variance (ANOVA) mean responses of low, middle and upper social class on the perceived impact of economic diversification on education would and other sectors of the economy

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Item** | **Group** | **Sum of Squares** | **df** | **F** | **Decision** | **Posthoc  test(Scheffe)** |
|  |  |  |  |  |  |  |  |
| 5 | Diversification on quality education would raise market for laboratory equipment  Diversification on quality education would raise market for stationery  Diversification on quality education would raise market for professional textbooks | Between Groups | 91.97 | 2  897  899 | 63.99 | S | 3.51 LSC |
| Within Groups | 644.56 |
| Total | 736.53 |
| 6 | Diversification on quality education would raise market for Furniture  Diversification on quality education would raise market for educational consultants and training services | Between Groups | 58.08 | 2  897  899 | 29.04 | S | 3.43 LSC |
| Within Groups | 575.56 |
| Total | 633.64 |
| 7 | Diversification on quality education would raise market for laboratory equipment  Diversification on quality education would raise market for stationery  Diversification on quality education would raise market for professional textbooks | Between Groups | 82.23 | 2  897  899 | 41.11 | S | 3.47 |
| Within Groups | 719.10 |
| Total | 801.33 |
| 8 | Diversification on quality education would raise market for Furniture  Diversification on quality education would raise market for educational consultants and training services | Between Groups | 59.45 | 2  897  899 | 29.73 | S | 3.33 |
| Within Groups | 620.74 |
| Total | 680.19 |
| 9 | Diversification on quality education would raise market for laboratory equipment  Diversification on quality education would raise market for stationery  Diversification on quality education would raise market for professional textbooks | Between Groups | 97.39 | 2  897  899 | 48.69 | S | 3.51 LSC |
| Within Groups | 792.34 |
| Total | 889.73 |
| 10 | Diversification on quality education would raise market for Furniture | Between Groups | 49.64 | 2  897  899 | 38.43 | S | 3.43 LSC |
| Within Groups | 579.32 |
| Total | 628.96 |

The analysis of Table 4 showed, that at 0.05 level of significance, all items are significant; hence, the null hypothesis 2 was rejected. This infers that, there is significant differences in the mean responses of the respondents, which arose as a result of a difference in lower social status of the respondents as showed by scheffe test.

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**Findings of the study**

1. The respondents all agreed that, all the items are opportunities for economic diversification in educational sector
2. There is significant difference in the mean responses of low, middle and upper social class on the opportunities in education sector that attracts economic diversification
3. There is significant difference in mean responses of low, middle and upper social class on the impact of economic diversification on quality education would have on other sectors of economics

**Discussion of Results**

The study determines the opportunities in education and perceived impact of education diversification on education and other sector of the economy. The findings based on the analysis done, is related to the findings of other authors such as Fagge (2016) and Francis (2016). Table 1 revealed 4 areas of opportunities that are viable to attracts investment in quality education in Nigeria. Hence, with these huge opportunities revealed as the findings of this study, there is a fertile ground for the diversification of the economic in educational sector. The findings of this study are in agreement with the views of Miller (2016) and Akhtar (2010) who noted that education remains a key potential for economic diversification as there is a quest for deeper and broader knowledge and skills to engage youths to be productive participants in our evolving commonwealth and its economy. The findings also in consonant with Fagge(2016) who noted that with the potentials Nigeria has, it can generate revenues more than what the crude oil is generating.

Table 2 showed the analysis on the impact of diversification of the economy in education sector on the growth of other sectors of the economy such as training. The result of this finding revealed 6 sectors of the economy in which an improved quality of education will have on other sectors of the economy quality education would raise market for transport and aviation industries. The findings are consistent with views of Omoetteh (2016) who noted the impact of education on other sectors of the economy are numerous, such as in aviation, security, research and development. The finding also concord with Miller (2016) who underscores that the impact of improving quality education position the nation to grow with technology, hence technology advancement is another impact of sound education.

**Conclusion**

The opportunities in educational sector for economic diversification. It was found out that, huge opportunities lie in educational sector that can assist economic diversification into the sector. Besides, improving on the quality education will raise so many activities and businesses in other sector of the economy. Hence, the study concludes that there are level ground and economic opportunity in education sector that worth diversification of the economy, as it impact is not limited to human resource development but an engaged economic production.

**Recommendations**

Based on the findings of this study, the following recommendations were made:

1. Government should diversify its economy towards education sector.
2. An enabling environment should be provided for investor to invest in education sector through training and provision of scholarship.

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**PRACTICES REQUIRED BY LECTURERS OF AGRICULTURAL EDUCATION IN SELECTED AGRO-CLIMATOLOGICAL INSTRUMENTS FOR INSTRUCTIONAL DELIVERY IN COLLEGES OF EDUCATION IN ADAMAWA AND BAUCHI STATES, NIGERIA**

**BY**

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**Abstract**

*The purpose of the study was to determine the**practices required by lecturers of agricultural education in utilizing agro-climatological instruments for instructional deliver in Colleges of Education in Adamawa and Bauchi States, Nigeria. The study adopted survey research design. Four research questions guided the study. The area of the study was Adamawa and Bauchi States. The population of the study was 56 respondents comprising of lecturers of agricultural education in Colleges of Education. The entire population was used for the study. Therefore there was no sampling as the population was manageable. The instrument for data collection was a structured questionnaire named “selected agro-climatological instruments questionnaire” (SAIQ). Three experts validated the instrument and was trial tested. A Cronbach Alpha coefficient of 0.86 was established indicating that the instrument was reliable to elicit information for the study. Fifty six copies of the questionnaire were administered on the respondents by the help of two research assistants in the two states. One hundred percent of the questionnaire was retrieved. The data collected was analyzed using weighted means and standard deviation to answer the four research questions. It was found that all the 61 practices identified in utilizing the selected agro-climatological instruments were required by lecturers of agricultural education in Colleges of Education. The results showed that lecturers of agricultural education require the practices in utilizing the following items: 20 practices in maximum and minimum thermometer, 19 practices in rain gauge, 8 practices in barometer and 14 practices in hygrometer. Based on the findings of the study, it was recommended among others that: lecturers of agricultural education in Colleges of Education should utilize the identified practices in the selected agro-climatological instrument to train students.*

**Keyword:** Agricultural Education, Agro-climatology, instruments, Practices, Utilizing.

**Introduction**

Agricultural Education programme is a course of study in Universities and Colleges of Education in Nigeria. Osinem (2007) described Agricultural Education as a process of imparting knowledge, skills and attitudes in agriculture to the learner at any level. In the view of Ukonze and Olaitan (2010), Agricultural Education is a programme designed for preparing or equipping learners with knowledge, skills and attitude in teaching and technical areas of agriculture to enable them impart same to students in Schools and Colleges. In the opinion of Akpomedaye (2011), Agricultural Education is an occupational education design to develop a particular knowledge and skills associated with various farming techniques. In this study, Agricultural Education is a programme in Colleges of Education and other tertiary institutions designed with series of activities for equipping students with knowledge, skills and attitude in pedagogy in agriculture required for effective teaching of content areas in agriculture to students in primary and secondary schools after graduation.

Agricultural Education as a course of study is offered in Colleges Education. A College of Education is a tertiary institution that offers three years minimum training to students in programmes of interest such as Agricultural Education for entry into teaching profession (Federal Republic of Nigeria (FRN), 2004). The objectives of Agricultural Education programme in Colleges of Education are to:

* prepare graduates with right attitudes and knowledge/professional competence in vocational agriculture;
* Produce teachers who will be capable of motivating students to acquire interest in and aptitude for agriculture; among others (National Commission for Colleges of Education (NCCE), minimum standard, 2012).

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In order to achieve the above objectives, the National Commission for Colleges of Education in its Minimum Academic Standard clearly listed courses to be offered by students in Agricultural Education to cover: Introduction to agriculture, Poultry production, Fish production, Principles of farm management, Youth organizations in agriculture, Horticulture, Land survey and farmstead planning, Agro-climatology, among others (NCCE, 2012). This study is focused on practices required on agro-climatology aspect of the programme.

The study of climates as applied to their effect on the productivity of plants and animals of agricultural importance is called agro-climatology. In the view of Saravanan (1994), Agro-climatology is defined as the meteorological, climatological and hydrological conditions which are significant for agriculture owing to their integration with the objects and process of agricultural production. Climate Prediction Centre, US report (2006), explained that agro-climatology is the study of climate in relation to its effects on water, soil, crop and livestock. Chang (2013) viewed agro-climatology as the study of climate in relation to the productivity of plants and animals of agricultural importance. The author reiterated that the main aim of agro-climatology is to obtain necessary information about climate and apply them for the purpose of improving farming practices and increasing agricultural productivity in quantity and quality. In Agricultural Education programme of Colleges of Education, the objectives of agro-climatology as contained in the curriculum of NCCE, minimum standard (2012) are to:

* 1. prepare graduates with basic knowledge in scope and general principles of agro-climatology;
  2. develop in student-teachers the appropriate skills in operating equipment used in agro-climatology;
  3. Produce teachers who will be capable of explaining and predicting the effects of climatic elements on crops, livestock and soil in the ecological zones of Nigeria, and equip the student-teachers with adequate knowledge and ability to forecast weather for agricultural benefits.

The objectives of agro-climatology are contained in the content which includes the meaning and scope of agro-climatology and equipment used in the study, ecological zones of Nigeria and their effects on distribution of crops, livestock and soil formation and principles underlining weather forecasting (NCCE, 2012). The objectives of agro-climatology are achieved with effective use of agro-climatological instruments that serve as instructional materials to teach students of agriculture in Colleges of Education.

Instrument is a device for measuring or displaying something. In the view of Ahrens (2009), instrument is a tool or device used for a particular task, especially for delicate or scientific work. In this study, instruments are those tools and devices used by lecturers of agricultural education as instructional materials to teach agro-climatology to students. The selected instruments required for the study of agro-climatology include: Maximum and Minimum thermometers, Rain gauge, Barometer and Hygrometer (NCCE, 2012). These instruments are recommended to be used by lecturers for instructional delivery of the content of agro-climatology in agricultural education programme in Colleges of Education.

The National Policy on Education (FRN), (2004), stated that a lecturer is a person who had undergone approved professional training in education at appropriate levels and is capable of imparting knowledge, skills and attitudes to the learners in a relevant programme. A lecturer of Agricultural Education, as explained by Isiwu and Okonkwo (2013), is a person who had undergone a teacher preparatory programme in the University and saddled with the responsibility of imparting knowledge, skills and attitudes in agriculture to students. Lecturers in this study are individuals who had undergone training in pedagogical and technical aspects of Agricultural Education programme in a University and have the onus of teaching agro-climatology to students of agriculture in Colleges of Education and other tertiary institutions. The lecturers of Agricultural Education teach courses in agricultural education including agro-climatology and evaluate them for competence before they are allowed to graduate. The lecturers put into practice the recommended instruments by the NCCE in the Minimum Standard for instructional delivery of agro-climatology to students. A practice, in the submission of Asogwa and Omeje (2017), is a process of carrying out plan, idea or theory. This involves a way of carrying out something that has been established through knowledge and experiences. Practice, in this study, is the step - by – step (skilled) activities in instructional delivery in the selected agro-climatological instruments that was developed through knowledge and experiences by expert in the field. It involves the tasks and actions in minimum and maximum thermometers, rain gauge, barometer and hygrometer required by lecturers of agricultural education for instructional delivery in Colleges of Education.

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The occupation of the people of Adamawa and Bauchi States, Nigeria is farming. The farming activities are mostly affected by the climatic conditions of the areas, where the average rainfall is under 1000mm and temperature over 230C (Aregheore, 2010). The climatic factors are not static; they fluctuate with the passage of years, which is a global phenomenon. Adakayi (2012) reported in his study that there was lower temperature and rainfall between 1970s and 1980s and higher temperature and rainfall between 1990s and 2000s. Ladan (2014) indicated that daily rainfall records of 30 years in Northern Nigeria revealed the impact of global climate change in form of increasing number of dry spells during the rainy season leading to drought and desertification. These fluctuations of the climatic factors affect agricultural activities of the populace in these states as they depend on the natural phenomena. The Federal Government of Nigeria perceived the need to improve the agricultural activities of Nigerians to enhance food production, and have introduced the study of Agricultural Education as a course of study in Universities and Colleges. The Colleges of Education through directives of the National Commission for Colleges of Education minimum standard employ qualified lecturers to teach Agricultural Education to students. The lecturers teach agro-climatology to students, which they are evaluated for competence and mastery for the award of Nigeria Certificate in Education (NCE).

The researcher observed that the Teachers of Agricultural Science in Secondary Schools could not practice with the agro-climatological instruments, which made the researcher to engage in discussions with them in secondary schools during teaching practice supervision. It was discovered that they found it difficult to teach and even practice with the agro-climatology facilities where they exist. The teachers indicated that they had problems of preparation by their lecturers in Colleges of Education as they concentrated mostly on the theoretical aspect of agro-climatology. Indeed, this is in consonance with the finding of Atsumbe, Okoro & Ogwo (2012) who revealed that students were loaded with the theoretical knowledge aspect of the programme of study than the practical aspect by the lecturers in tertiary institutions. The Nigeria Certificate in Education (NCE) teachers of agriculture in Secondary Schools associated their difficulties in practicing with agro-climatological instruments to their preparation procedures.

The Lecturers of Agricultural Education in Colleges of Education and other tertiary institutions are generally prepared in technical and pedagogical areas of agriculture from Nigerian Universities and are obliged to work in any College of Education in Nigeria where opportunities exist (Isiwu & Okonkwo, 2013). However, from the observations and discussion of the researcher with the teachers of agriculture in some secondary schools during teaching practice supervision, it reveals that lecturers of Agricultural Education in Adamawa and Bauchi States of Nigeria like any other College of Education in Nigeria require the practices in some selected agro-climatological instruments for instructional delivery to students. The practices required by lecturers in instructional delivery in selected agro-climatological instruments necessitated this study.

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The main objective of this study was to determine the practices required by lecturers in selected agro-climatological instruments for instructional delivery to students of agriculture in Colleges of Education in Adamawa and Bauchi States, Nigeria. Specifically, the study focused on the determination of:

1. Practices required by Lecturers in utilizing minimum and maximum thermometers for instructional delivery to students of agriculture in Colleges of Education;
2. Practices required by Lecturers in utilizing rain gauge for instructional delivery to students of agriculture in Colleges of Education;
3. Practices required by Lecturers in utilizing hygrometers for instructional delivery to students of agriculture in Colleges of Education;
4. Practices required by Lecturers in utilizing barometers for instructional delivery to students of agriculture in Colleges of Education;

**Research Questions**

The following research questions guided the study:

1. What are the practices required by Lecturers in utilizing minimum and maximum thermometers for instructional delivery to students of agriculture in Colleges of Education?
2. What are the practices required by Lecturers in utilizing rain gauge for instructional delivery to students of agriculture in Colleges of Education?
3. What are the practices required by Lecturers in utilizing barometer for instructional delivery to students of agriculture in Colleges of Education?
4. What are the practices required by Lecturers in utilizing hygrometer for instructional delivery to students of agriculture in Colleges of Education?

**Methodology**

The study adopted the survey research design. The design was appropriate for this study since data collection was from the respondents (Subjects) for determining practices required by lecturers of Agricultural Education in utilizing some selected agro-climatological instruments for instructional delivery to students in Colleges of Education. The area of the study was Adamawa and Bauchi States in North-East Nigeria. The area falls within the Guinea Savannah Ecological zone of Nigeria (Ishaku & Majid, 2010) with annual rainfall ranging from 400mm - 1500mm (Ishaya & Majid, 2010). Abaje, Ati and Iguisi (2012) explained that the zone is located between latitude 80N and 140N and longitude 70E and 140E. Educational institutions in this area range from primary to tertiary with most of the students from farming families as well as teachers and lecturers. The Agricultural Science teachers and Agriculture Education Lecturers were expected to be competent in instructional delivery to their students on utilizing the selected agro-climatological instruments to be able to monitor the change in climate for agricultural purposes.

The population of the study was 56 Lecturers of Agricultural Education in the Colleges of Education in Adamawa and Bauchi States, Nigeria.The sample for the study was 56 which was the entire population of the respondents. There was no sampling for the study due to manageable size of the population. Therefore, the entire population was used for the study.

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The instrument for data collection was a structured questionnaire named “Selected Agro-climatological Instruments Questionnaire” (SAIQ). The questionnaire was developed by the researcher from the literature reviewed on the selected agro-climatological instruments. The questionnaire was organized based on the selected agro-climatological instruments; Maximum and Minimum thermometers (20 items), Rain gauge (19 items), Barometer (8 items) and Hygrometer (14 items). Each section had a 4-point response options of highly required (HR), averagely require (AR) slightly required (SR) and not required (NR) with corresponding values of 4, 3, 2 and 1 respectively. The questionnaire was administered on the lecturers of Agricultural Education in Colleges of Education, both Federal and State.

The instrument was face and content validated by 3 experts, 1 from Agricultural Education Department, Federal University of Agriculture, Makurdi, 1 from Federal College of Education Yola and 1 from College of Education, Zing. These experts were required to read the questionnaire items thoroughly and correct wrong spellings, wrong information and unclear or ambiguous statements on the questionnaire items. They were requested to remove any information that was not necessary and or add any missing information that was needed. The corrections and suggestions by the experts were used to develop the final copy of the instrument for data collection. Face validation judges at the face value the appropriateness of a measuring instrument (Uzoagulu, 1998 & Jen, 2002). Emaikwu (2011) added that face validity refers to whether tests of instrument appear valid on the ‘face of it’. Also that it was the extent to which a test seems to measure what it purports to measure. Content validity on the other hand was the degree to which the sample of test items represents the content that the test was designed to measure.

Fifteen copies of the SAIQ were administered (trial tested) on 15 lecturers sampled from College of Education, Katsina Ala in Benue State. This was based on a research rule to trial test outside area of study to avoid any study bias. The data collected were analyzed using Statistical Package for Social Sciences (SPSS) and a Cronbach Alpha reliability coefficient of 0.83 was obtained which indicated the internal consistency of the instrument. The Cronbach Alpha value of 0.83 was high enough indicating that the instrument (SAIQ) was reliable to elicit data for the work.

The researcher employed the services of two research assistants (one from each State) to help in the administration of the instrument (SAIQ) on the respondents in their respective States. The research assistants were trained on how to administer and retrieve the instruments from the respondents. A total of 56 copies of the questionnaire were administered on the respondents through the two research assistants who in turn retrieved the entire questionnaire after having checked the responses on each questionnaire item. The data collected from the respondents were analyzed using weighted mean and standard deviation which were used to answer the research questions. A mean of 2.50 was used for decision making. Any item with a mean value of 2.50 or above was regarded as a practice that is required while any item with a mean less than 2.50 was regarded as not required.

**Results**

**Table 1:** Mean ratings of the respondents on the Practices Required by Lecturers in Utilizing Maximum and Minimum Thermometers for Instructional Delivery in Agriculture in Colleges of Education

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N**  ***Jifin D. Tsojon*** | Item statement | Mean | SD |
| 1. | Identify the instruments used to measure temperature | 3.55 | 0.78 |
| 2. | Identify and source the type of thermometers from the market | 3.56 | 0.72 |
| 3. | Insert each thermometer into a protective shealth with two rings and hang on the brass hooks in the screen | 3.65 | 0.67 |
| 4. | Install the thermometers out of direct sunlight so that it reads the temperature of the air. | 3.63 | 0.71 |
| 5. | Read temperature in degree Celsius (0C) | 3.57 | 0.72 |
| 6. | Read the temperature to the nearest whole degree | 3.64 | 0.68 |
| 7. | Read the highest and lowest temperatures | 3.61 | 0.67 |
| 8. | Stand 25cm from the thermometers to avoid breathing on it | 3.57 | 0.72 |
| 9. | Hold the thermometers away from your breath | 3.62 | 0.71 |
| 10. | Avoid use of matches to light to read thermometers at night | 3.54 | 0.72 |
| 11. | Read temperatures on the thermometers at night using flash light | 3.61 | 0.74 |
| 12. | Read maximum mercury thermometer at eye level | 3.62 | 0.74 |
| 13. | Read maximum mercury thermometer at right angle | 3.67 | 0.67 |
| 14. | Read minimum alcohol thermometer at right angle to the nearest half degree | 3.69 | 0.56 |
| 15. | Convert degree Fahrenheit to degree Celsius | 3.67 | 0.55 |
| 16. | Place the thermometer in shade to avoid sunshine | 3.66 | 0.61 |
| 17. | Reset indices of thermometer magnetically or by tilting after reading | 3.58 | 0.67 |
| 18. | Reset indices of thermometer after reading by tilting | 3.65 | 0.61 |
| 19. | Record reading and keep for future use | 3.59 | 0.63 |
| 20. | Clean the thermometers occasionally | 3.66 | 0.64 |

Data in Table 1 revealed that the twenty (20) practices had their means ranging from 3.55 to 3.69 and were above the cutoff point of 2.50. This indicated that the respondents agreed that all the items were practices required by lecturers of Agricultural Education in utilizing Maximum and Minimum thermometers for instructional delivery of agriculture in Colleges of Education in Adamawa and Bauchi States, Nigeria. Table 1 also showed that the standard deviation of the items ranged from 0.55 to 0.78 which means that the respondents were not too far from the mean and opinion of one another in the responses.

**Table 2:** Mean ratings of the respondents on the Practices Required by Lecturers in Utilizing Rain Gauge for Instructional Delivery in Agriculture in Colleges of Education

|  |  |  |  |
| --- | --- | --- | --- |
| S/N | Item statement | Mean | SD |
| 1. | Identify the instrument used to measure rainfall | 3.65 | 0.59 |
| 2. | Source rain gauge and collecting funnel from the market | 3.61 | 0.62 |
| 3. | Identify the graduated cylinder | 3.66 | 0.63 |
| 4. | Keep gauge away from obstacles such as trees and buildings to avoid obstruction of rain gauge | 3.67 | 0.55 |
| 5. | Ensure no obstacle to the funnel keep funnel free from obstacle such as leaves, grass or dirt to allow collection of rain fall | 3.63 | 0.59 |
| 6. | Keep top of rim of the gauge leveled for uniform collection of rain | 3.57 | 0.69 |
| 7. | Keep rain gauge graduate clean for the water level to be seen clearly | 3.59 | 0.59 |
| 8. | Clean the gauge graduate with mild soap and water, bottle mop or sponge for clear reading | 3.67 | 0.55 |
| 9. | Keep grass not longer than 5cm for a distance of 2m around the gauge | 3.66 | 0.53 |
| 10. | Install gauge at 30cm above ground level to prevent water splash from entering | 3.61 | 0.58 |
| 11. | Fasten the gauge to the ground to avoid splashing | 3.64 | 0.57 |
| 12. | Pour rain drops into the measuring cylinder for measurement | 3.57 | 0.64 |
| 13. | Take reading at eye level to avoid error due to parallax | 3.64 | 0.58 |
| 14. | Read to the accuracy of up to 0.1cm | 3.61 | 0.55 |
| 15. | Read each rainfall in a day | 3.67 | 0.52 |
| 16 | Read each rainfall immediately to avoid evaporation | 3.63 | 0.60 |
| 17. | Empty the gauge after each reading | 3.68 | 0.53 |
| 18. | Plot the rain gauge reading in a graph or in a table | 3.62 | 0.61 |
| 19. | Interpret the reading for agricultural benefit | 3.55 | 0.62 |

Data in Table 2 revealed that all the nineteen (19) items had their means ranging from 3.55 to 3.68 and were above the cutoff point of 2.50. This indicated that the respondents agreed that all the items were practices required by lecturers of Agricultural Education in utilizing Rain Gauge for instructional delivery of agriculture in Colleges of Education in Adamawa and Bauchi States, Nigeria. Table 2 also showed that the standard deviation of the items ranged from 0.52 to 0.69 which means that the respondents were not too far from the mean and opinion of one another in the responses.

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**Table 3:** Mean ratings of the respondents on the Practices Required by Lecturers in Utilizing Barometer for Instructional Delivery in Agriculture in Colleges of Education

|  |  |  |  |
| --- | --- | --- | --- |
| S/N | Item statement | Mean | SD |
| 1. | Identify the instrument used to measure air (Atmospheric) pressure | 3.67 | 0.55 |
| 2. | Source barometer from the market | 3.65 | 0.59 |
| 3. | Identify the unit of measuring atmospheric pressure | 3.71 | 0.53 |
| 4. | Show the recording aneroid barometer | 3.65 | 0.57 |
| 5. | Read the foil chart called barograms | 3.67 | 0.56 |
| 6. | Explain the principle of balancing the column of air against a column of mercury in a scaled glass tube | 3.63 | 0.62 |
| 7. | Demonstrate the fluctuation in air pressure producing corresponding differences in the height of the mercury | 3.58 | 0.65 |
| 8. | Read accurately using graduated vanier mounted along the tube | 3.58 | 0.65 |

Data in Table 3 revealed that all the eight (8) items had their means ranging from 3.58 to 3.67 and were above the cutoff point of 2.50. This indicated that the respondents agreed that all the items were practices required by lecturers of Agricultural Education in utilizing Barometer for instructional delivery of agriculture in Colleges of Education in Adamawa and Bauchi States, Nigeria. Table 3 also showed that the standard deviation of the items ranged from 0.53 to 0.65 which means that the respondents were not too far from the mean and opinion of one another in the response.

**Table 4:** Mean ratings of the respondents on the Practices Required by Lecturers in Utilizing Hygrometer for Instructional Delivery in Agriculture in Colleges of Education

|  |  |  |  |
| --- | --- | --- | --- |
| S/N | Item statement | Mean | SD |
| 1. | Identify the instrument used to measure relative humidity | 3.70 | 0.50 |
| 2. | Source hygrometer from the market | 3.65 | 0.54 |
| 3. | Identify the wet- and dry- bulb thermometer | 3.69 | 0.50 |
| 4. | Indicate where the wet- and dry- bulb thermometers are placed | 3.67 | 0.52 |
| 5. | Indicate how the wet- and dry- bulbs are placed | 3.70 | 0.48 |
| 6. | Identify which thermometer measures shade temperature (Td) | 3.70 | 0.50 |
| 7. | Show which thermometer measure lower reading (Tw) | 3.73 | 0.47 |
| 8. | Identify which thermometer has its bulb covered with muslin always dipped in distilled water | 3.73 | 0.45 |
| 9. | Demonstrate the wet bulb depression (Td - Tw) | 3.64 | 0.54 |
| 10 | Identify the psychometric table | 3.65 | 0.54 |
| 11. | Use the psychometric table to determine vapour pressure, dew point and relative humidity from the reading of wet- and dry- bulb thermometers | 3.54 | 0.61 |
| 12. | Read the relative humidity from the thermo hydrograph | 3.54 | 0.62 |
| 13. | Identify the unit of measuring relative humidity | 3.53 | 0.70 |
| 14. | Demonstrate how wet- bulb thermometer temperature lowers | 3.48 | 0.69 |

Data in Table 4 revealed that all the fourteen (14) items had their means ranging from 3.48 to 3.73 and were above the cutoff point of 2.50. This indicated that the respondents agreed that all the items were practices required by lecturers of Agricultural Education in utilizing Hygrometer for instructional delivery of agriculture in Colleges of Education in Adamawa and Bauchi States, Nigeria. Table 4 also showed that the standard deviation of the items ranged from 0.45 to 0.70 which means that the respondents were not too far from the mean and opinion of one another in the responses.

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**Discussion**

The findings on Table 1 showed that lecturers of Agricultural Education in Colleges of Education required 20 practices in utilizing Maximum and Minimum Thermometers for instructional delivery of agriculture. The practices include; identify the instrument used to measure temperature, identify and source the type of thermometers from the market, insert each thermometer into a protective shealth with two rings and hang on the brass hooks in the screen and install the thermometers out of direct sunlight so that it reads the temperature of the air, among others. This study is in agreement with that of Omeje and Asogwa (2013) who in a study on resource management practices of women farmers in melon production for poverty reduction in Enugu, Nigeria. They found out 13 practices in planning, 10 practices in pre-planting operations, 6 practices in planting operations, 7 practices in post planting and post harvesting operations, 7 practices on marketing operations and 28 practices in management of material resources. Such practices include; determine the right time for planting, test seeds for viability, dissolve appropriate fungicide in water for six hours, soak melon in the solution for 24 hours, mark space 1m between rows and 1m within rows and sow the soaked melon seeds 2-3 seeds per hole. Also Gertrude-Theresa, Francis, Vera and Alawa (2014) on their study on quality assurance and performance gap assessment of agriculture teacher in teaching yam production in Colleges of Education in Nigeria, found out that teachers needs to improve on 16 practices in planning and pre-planting operations, 16 practices in planting and post-planting operations and 15 practices in harvest operations. The practices include; select appropriate seedlings for planting, treat seedlings with appropriate chemicals, treat the face of the seedling with appropriate fungicide and plant yam at 1m x 1m space.

In Table 2, it was found from the study that lecturers of Agricultural Education in Colleges of Education require 19 practices in utilizing Rain Gauge for instructional delivery of agriculture. The practices include; identify the instrument used to measure rain fall, source rain gauge and collecting funnel from the market, identify the graduated glass and keep rain gauge away from obstacles such as trees and buildings to avoid obstruction of rain gauge. The study agrees with the findings of Obiyai, Ekpebu and Ekubo (2011) on entrepreneurship skills training modules for farmers in fish feed production and marketing occupation. It was found out that farmers require 10 practices on fish feed, 8 practices in fish feed processing and 5 practices in fish feed marketing occupation. Such practices include; procure and sore feedstuff, additive in warehouse for factory use, measure known quantities of feedstuff and transfer to grinder, crush and grind known quantities of feedstuff to formulate different types of feed ration and run out feed mixture from mixing into bags among others. Also this study is in line with the study of Egun (2010) on preparing agriculture science teachers: curriculum implication, found out 24 practices where those agriculture teachers require improvement practices in fish production. Some of the practices are; construct fish pond, stock pond with appropriate fingerlings, feed fish appropriately, harvest fish and grade fish for sale.

In Table 3, it was found from the study that lecturers of Agricultural Education in Colleges of Education require 8 practices in utilizing Barometer for instructional delivery of agriculture. The practices include; identify the instrument used to measure air (Atmospheric) pressure, source barometer from the market, identify the unit of measuring pressure, and read the foil chart called barograms, among others. This finding is supported by the findings of Obiyai, Osinem and Agbulu (2011) on development of entrepreneurship skill training modules for youth participation in fish preservation and marketing occupation. The study found 11 practices on planning and preservation, 10 practices on fish preservation and processing and 6 practices on marketing of fish and fish products. The practices include; identify mature fish, smoke fish adequately, preserve fish with less damage at reduced cost and store harvested fish at different chilling conditions. The finding is in consonant with the study of Emmanuel and Ariyo (2014) on assessment of skills possessed by teachers of metalwork in the use of computer numerically controlled machine tools in technical colleges in Oyo State. They found 16 practices in controlling milling machine. The practices include: set the knee elevation on the milling machine, set the table elevation on the milling machine, select suitable cutting speed to suit the material being milled, select the feed rate to suit the material being milled.

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In Table 4, it was found from the study that lecturers of Agricultural Education in Colleges of Education require 14 practices in utilizing Hygrometer for instructional delivry of agriculture. Some of the practices are; identify the instrument used to measure relative humidity, source hygrometer, identify the wet- and dry- bulb thermometers and indicate where the wet- and dry- bulb thermometers are placed and indicate how wet- and dry- bulbs are placed. This study is in line with the finding of Asogwa, Maduka and Olaitan (2013) on entrepreneurial skills by instructors for training students in horse husbandry for job creation and wealth generation. The study found 25 practices on breeding in horse husbandry, 23 practices on raising weanling to adult horse, 15 practices on health management of horse and 12 practices on marketing of horse. They stated that instructors require skill improvement to train students in horse husbandry for job creation and wealth generation. Some of the practices include; select hot blood or warm blood breeding stock with high growth rate and high adaption ability, buy stallions 7-10 months old for breeding, feed them appropriately with different rations for growth, egg and semen production and collect semen from the stallions at 3-4 years old using artificial vagina (AV) or elect-ejaculator. This research is in agreement with the study of Okwori, Adamu and Odo (2013) on evaluation of practical skills possessed by woodwork graduates of technical colleges in Niger State, Nigeria who found 8 practices in using consumables material by woodwork graduates; apply on wood surface to be joined, apply sanding sealer on wood surface for finishing process, use glass paper to smoothen wood surface, use formica to cover wood surface, fix hinges to door and cabinets, nail wood during rafter construction, fix handles and select right type of fabric material for upholstery.

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**Conclusion**

Practices required by lecturers of agricultural education in utilizing agro-climatological instruments in Colleges of Education in Adamawa and Bauchi States are significantly important. The findings of this study revealed that lecturers of agricultural education require those practices in utilizing Maximum and Minimum Thermometers, Rain gauge, Barometer and Hygrometer. It can also be concluded that determining the practices required by lecturers of agricultural education in Colleges of Education will bring to the fore those agro-climatological instruments that lecturers require for instructional delivery hence national development in the education sector. When their practices are improved upon will bring about the desired capabilities to utilize the agro-climatological instruments in imparting practical skills in students of agricultural education.

**Recommendation**

The following recommendations were made based on the findings of the study:

1. Lecturers of agricultural education in Colleges of Education should utilize the practices identified in instructional delivery of agriculture.
2. NCE teachers of Agricultural science should rehearse the practices identified before utilizing agro-climatological instruments for instructional delivery in agriculture.
3. National Commission for Colleges of Education (NCCE) should use the practices identified to draw up practical curriculum in utilizing of agro-climatological instruments for instructional delivery of agriculture.

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1. Researchers can leverage on the findings of this study to be included in their empirical study.

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APPENDIX A

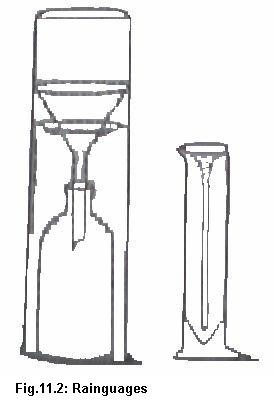
**SELECTED AGRO-CLIMATOLOGICAL INSTRUMENTS**

 Barometer

Maximum and Minimum thermometers

Hygrometer

Rain gauge and measuring cylinder



**REBRANDING TVET FOR EFFECTIVE SERVICE DELIVERY TOWARDS NATIONAL DEVELOPMENT THROUGH INFORMATION COMMUNICATION AND TECHNOLOGY**

**BY**

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**Abstract**

*The significance of Technical and Vocational Education and Training (TVET) as a change agent for national improvement has been a topic of discussion at summits, scholarly gatherings and policy circles in Nigeria and other developing countries. However, the aim of TVET is yet to be achieved in the developing nations, probably due to the numerous challenges facing the project. There is a research need to determine measures of rebranding TVET towards effective delivery in Nigeria. Therefore, this paper was designed to determine the level of impact of the use of Information Communication Technology (ICT) tools on the rebranding process of office technology and management, and building technology education delivery for the attainment of best practice towards national development. It was planned to determine ways ICT promotes best practice in office technology and management, and building technology education delivery. Research information were gotten from questionnaire survey that seeks the views of 210 respondents. The information were analysed using the relative contribution index. The findings indicate that smart phone, mobile technologies, internet, computer, podcast, teleconferencing device, ipad and intranet are ICT tools that have very high positive impacts on office technology and management, and building technology education delivery. Enabling benchmarking practice, promoting the use of project network, enhancing the use of Computer Aided Design and Drafting (CADD) and supervision exercise are the most significant ways ICT promotes best practice in office technology and management, and building technology education delivery. It is recommended that further research be conducted on the development of ICT-based best practice framework in TVET delivery for national development in Nigeria.*

**Keywords:** TVET, Service delivery, Best practice, National development, ICT

**Introduction**

TVET involves the utilization of specialized aptitudes, human capacities, intellectual comprehension, state of mind and work propensities in the realm of work. Its aim is to inculcate entrepreneurial and technical skills in the youths and school leavers as a way of providing adequate skilled manpower that is required in the society for effective service delivery towards national improvement. The significance of Technical and Vocational Education and Training (TVET) as a change specialist for social, financial, innovative and national improvement has been a subject of talk at summits, scholarly meetings and policy circles in Nigeria and other developing countries (Raimi & Akhuemokham, 2014; Ladipo Akhuemonkhan & Raimi, 2013; Ojimba, 2012). There is an assention among analysts and experts that TVET is the mystery behind national improvement (Pong, Effah, Osei-Owusu, Obinnim, & Sam., 2014). TVET has attracted different names as stated in Ladipo *et al*. (2013) and Walba (2010) because of its importance to national development.

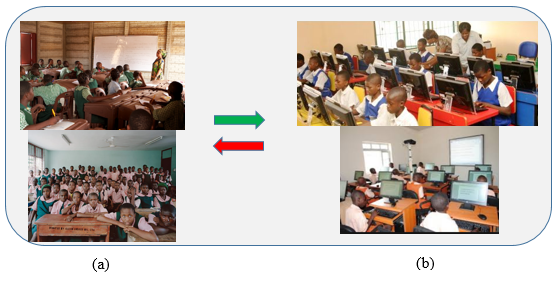
Despite several discussions on TVET at summits, scholarly gatherings and policy circles in Nigeria, the aim of TVET is yet to be achieved in the country, probably due to numerous challenges outlined by Okoye and Arimonu (2016). Rebranding TVET could be a way forward for effective service delivery to the society.

Rebranding is the process of changing the old method of doing things and deliberately creating a better attitude towards doing the same thing for competitive advantage and for better image portrayal. In the spirit of rebranding, Prof. Dora Akunyili initiated and manned a rebranding project during the fourth Nigerian republic by deploying the various components of Information Communication Technology (ICT) as a dependable rebranding tool for national development in Nigeria (Eze, 2013). In an attempt to rebrand TVET, National Board for Technical Education (NBTE) affirmed the foundation of one hundred and forty seven (147) Vocational Enterprise Institutes (VEIs) and Innovation Enterprise Institutes (IEIs) to compliment the on-going endeavours of Technical and Vocational Institutes in Nigeria (NBTE, 2016).

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ICT is a veritable tool for rebranding TVET. It refers to different innovations that improve a few purposes like the creation, stockpiling, preparing, correspondence and dissemination of data (Eze, 2013). Elements of ICT include communication media (e.g. radio, television), information machine (e.g. computers), and telecommunication technologies and equipment (e.g. satellite, fiber, optic cable, phones and facsimile machines).

The application of ICT in TVET could lead to best practices for the acquisition of practical skills. For instance, in Figure 1, which shows the setting of a traditional and ICT-based classroom, Figure 1a represents the bored, disengaged, isolated, daydream, asleep and disconnected nature of a traditional classroom setting. This kind of setting does not promote teaching and learning in the technology driven world. Figure 1b portrays a learner-centered environment. Thus, the use of ICT in the classroom increases students’ motivation and interest (Egba *et al*., 2018; Eze, 2013).



*Figure 1: Classroom setting: (a) traditional classroom, (b) ICT-based classroom (www.google.com)*

Although the impact of ICT on teaching and learning of various subjects has been studied by previous researchers (Uwameiye, 2015; Igwe, 2015; Ogbu and Onele, 2016; Egba *et al*., 2018), the study of the use of ICT for rebranding TVET has not received enough research attention. This paper presents the analysis of the use of ICT in rebranding TVET for effective service delivery towards national development. The technical and vocational subjects that were considered in the study were Office Technology and Management, and Building Technology Education. Both are interrelated as they involve technical process and methods that lead to national development. Office technology and management is the investigation of innovation and the securing of commonsense aptitudes, state of mind, comprehension and learning identified with occupation in different areas of monetary and social life (Onwuachu, 2014; Ehirheme, 2014). On the other hand, building technology education is the study of the application of technology to the design and construction of buildings. It is a component of architecture and building engineering. It constitutes tools and techniques for the creation of building.

**Research Objectives**

1. To determine the level of impact of the use of ICT tools on the rebranding process of office technology and management, and building technology education delivery.
2. To determine ways ICT promotes best practice in office technology and management, and building technology education delivery.

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**Research Questions**

1. What is the level of impact of the use of ICT tools on the rebranding process of office technology and management, and building technology education delivery?
2. What are the ways ICT promote best practice in office technology and management, and building technology education delivery?

**Methodology**

The study was carried out in Ebonyi State. The survey research approach was used. The population of the study was 632. This comprised 43 teachers and 589 practcing graduates of office technology and management, and building technology education in Ebonyi State of Nigeria. The study used a sample of 210 teachers and practicing graduates. The instrument used was structured questionnaire developed by the researchers for data collection from the respondents. The instrument has a five points rating scale. Three experts validated the instrument. The research instrument yielded a Cronbach’s alpha reliability coefficient of 0.86. The Relative Contribution Index (RCI) shown in equation 1 was used to analyse the data.

|  |  |
| --- | --- |
|  | (1) |

Where; w denotes the weight doled out to a variable by a respondent (w ranges from 1 to 5), A signifies the highest weight, and N connotes the total number of respondents.

Any item in the instrument with RCI of 0.60 and above was regarded as accepted. While item with RCI below 0.60 was regarded as not accepted.

**Results**

Demographic Analysis of the Respondents

The demography of the respondents is presented in Table 1. The investigation of the demography of the respondents presented in Table 1 shows that 85.71 % of the aggregate respondents are practicing graduates of office technology and management, and building technology education disciplines, while 14.29 % are teachers of office technology and management, and building technology education disciplines. 50.48 % of the aggregate respondents are males, and 33.81 % have been in practice for more than 20 y.

**Table 1:** Demography of the respondents

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Characteristics | Gender | |  | Years of practice | | Total |
|  | Male | Female | < 20 y | | > 20 y |  |  |
| Practicing graduates | 92 | 88 | 120 | | 60 | 180 |
| Technical and vocational teachers | 14 | 16 | 19 | | 11 | 30 |
| Total | 106 | 104 | 139 | | 71 | 210 |

*Research Question 1*

What is the level of impact of the use of ICT tools on the rebranding process of office technology and management, and building technology education delivery?

Table 2: Level of impact of the use of ICT tools on the rebrandingprocess of office technology and management, and building technology education delivery

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ICT tools | Practicing graduates | | Technical and vocational teachers | |
| RCI | Rank | RCI | Rank |
| Computers | 0.84 | 3 | 0.81 | 6 |
| Internet | 0.83 | 4 | 0.83 | 4 |
| Intranet | 0.80 | 8 | 0.80 | 7 |
| ipad | 0.82 | 5 | 0.80 | 7 |
| Digital Versatile Disc (DVD) | 0.64 | 13 | 0.68 | 11 |
| Podcast | 0.81 | 6 | 0.84 | 3 |
| Mobile technologies | 0.86 | 1 | 0.85 | 2 |
| Compact Discs (CDs) | 0.64 | 13 | 0.60 | 15 |
| Digital projectors | 0.69 | 11 | 0.63 | 14 |
| Television | 0.75 | 10 | 0.71 | 10 |
| Scanner | 0.63 | 15 | 0.65 | 13 |
| E-library | 0.78 | 9 | 0.79 | 9 |
| Teleconferencing device | 0.81 | 6 | 0.83 | 4 |
| Smart/interactive white board | 0.68 | 12 | 0.66 | 12 |
| Smart phone | 0.86 | 1 | 0.87 | 1 |

Table 2 shows the relative contribution index of the level of impact of the use of ICT tools on the rebranding process of office technology and management, and building technology education delivery. All the item statements were accepted since they have RCI above 0.06.

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Research Question 2

What are the ways ICT promote best practice in office technology and management, and building technology education delivery?

**Table 3:** Ways ICT promotes best practice in office technology and management, and building technology education delivery

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Ways IT promote best practice in building technology  education delivery | Practicing graduates | | | Technical and vocational teachers | | |
| RCI | Rank | | RCI | Rank | |
| ICT promotes the use of project network | 0.84 | | 2 | 0.86 | | 1 |
| ICT enhances the use of Computer Aided Design and Drafting (CADD) | 0.82 | | 3 | 0.81 | | 6 |
| ICT provides a suitable platform for exchange of information among designers during building design | 0.85 | | 1 | 0.84 | | 3 |
| ICT simplifies quantity take-off process | 0.78 | | 7 | 0.75 | | 9 |
| ICT encourages the reuse of experience | 0.80 | | 5 | 0.83 | | 4 |
| ICT enables benchmarking practice  ICT promotes administrative activities in office technology  and management, and building technology | 0.81  0.76 | | 4  8 | 0.86  0.71 | | 1  10 |
| ICT enhances supervision exercise | 0.75 | | 9 | 0.80 | | 7 |
| ICT makes maintenance operation easy | 0.80 | | 5 | 0.82 | | 5 |
| ICT enables operation of plants and machinery in building site | 0.73 | | 10 | 0.77 | | 8 |

Table 3 shows the relative contribution index of the ways ICT promotes best practice in office technology and management, and building technology education delivery. All the item statements were accepted since they have RCI above 0.06.

**Discussion of Findings**

The findings of the study in Table 2 show that smart phone has the highest ranked positive impact on the rebranding process of office technology and management, and building technology education delivery with an RCI of 0.865, followed by mobile technologies with RCI of 0.855. Other ICT tools with RCI higher than 0.80 are internet, computer, podcast, teleconferencing device, ipad and intranet. E-library and television have average RCI higher than 0.70. Digital versatile disc, compact disc, digital projector, scanner and smart/interactive white board have average RCI higher than 0.60. It implies that all the items in Table 2 have positive impacts on the rebranding process of office technology and management, and building technology education delivery. The findings are in line with the report of Ogbu and Onele (2016) that ICT and its tools enhance the study of technical subject like electrical and electronics education for effective service delivery.

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The findings in Table 3 show that the practicing graduates share the opinion that enabling benchmarking practice, promoting the use of project network and enhancing the use of CADD are the most significant ways ICT promotes best practice in office technology and management, and building technology education delivery. Other most relevant ways are providing a suitable platform for exchange of information among designers during building design, encouraging the reuse of experience, and making maintenance operation easy. The factors specified above have normal RC higher than 0.80. Technical and vocational education teachers have the same view with the practicing graduates, but added enhancing supervision exercise to the rundown of the most noteworthy ways of promoting best practice in office technology and management, and building technology education delivery through the use of ICT. Other promising ways of promoting best practice in office technology and management, and building technology education delivery through the use of ICT are enabling operation of plants and machinery in building site, and promoting administrative activities in office technology and management, and building technology with average RCI of 0.75 and 0.735. The findings imply that ICT is a useful tool for achieving best practice in TVET delivery, especially in a developing country like Nigeria. The findings support the submission of Uwameiye (2015) that ICT is a veritable tool for revitalizing subjects in the education section. It also collaborates with the findings of Anyigor-Ogah and Egba (2018) that ICT is a change agent for national development, even in the area of waste management.

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**Conclusion**

The paper presents ways of achieving best practice in office technology and management delivery as well as building technology education delivery for national development through ICT. A questionnaire instrument was used to ascertain the opinions of the respondents on the level of impact of the use of ICT tools on the rebranding process of office technology and management, and building technology education delivery, as well as ways ICT promotes best practice in office technology and management, and building technology education delivery.

The findings demonstrate that smart phone, mobile technologies, internet, computer, podcast, teleconferencing device, ipad and intranet are ICT tools that have very high positive impacts on office technology and management, and building technology education delivery. Other ICT tools with significant impact on office technology and management, and building technology education delivery are E-library, television, digital versatile disc, compact disc, digital projector, scanner and smart/interactive white board. On the other hand, enabling benchmarking practice, promoting the use of project network, enhancing the use of CADD and supervision exercise are the most significant ways ICT promotes best practice in technology and management, building technology education delivery. Other most relevant ways are providing a suitable platform for exchange of information among designers during building design, encouraging the reuse of experience, and making maintenance operation easy. Other promising ways are enabling operation of plants and machinery in building site, and promoting administrative activities in building technology. It is recommended that further research be conducted on the development of ICT-based best practice framework in TVET delivery for national development in Nigeria.

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**STRENGTHENING PARTNERSHIP AFFORDANCES BETWEEN TVET INSTITUTIONS AND INDUSTRIES THROUGH SCHOOL PRODUCTION UNITS / CONSULTANCY SERVICES**

**BY**

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**Abstract**

*The establishment of school production units / consultancy services in TVET institutions has been seen to play not only the role of ensuring that students graduate with relevant skills, knowledge and attitudes but also provides a vital ground for partnership between TVET institutions and industries. This study focused on strengthening the partnership affordances between TVET institutions and industries through school production units / consultancy services. Structured questionnaire was used to collect data from 158 participants randomly drawn from 5 technical colleges and 2 tertiary institutions within three different major towns in Enugu State. Data collected were analyzed using descriptive statistics namely percentages and mean to answer the research questions while t-test was used in testing the two null hypotheses at 0.05 level of significance. Results revealed that the 72.01% of the overall school production units / consultancy services were not functional while only 27.99% were functional in TVET institutions. Furthermore, it was generally accepted that strengthening partnership between TVET institutions and industries involves linking institutions with industries’ master tradesmen, providing opportunities for collaboration with industries and between institutions, creating platform for industries’ idea infusion in TVET. However, lack of organizational vision for productivity, poor perception, lack of basic equipment and manpower, perceived extra labour or burden on staff members were some challenges of school production units / consultancy services. The study recommends the establishment of more school production units / consultancy services to reduce overdependence on government, synergy of theory and practice among others.*

**Introduction**

There is still lingering upsurge in the Nigeria’s unemployment rate. National Bureau of Statistics ([NBS], 2017) reported a rise from 14.2% in the fourth quarter of 2016 to 18.8% in the third quarter of 2017. Likewise, the Nigeria labour population increased from 83.9 million in the second quarter to 85.1 million in the third quarter of 2017. There is need to scale up Nigeria’s capacity for job creation by developing knowledge skills and attitude necessary for improving the workforce, establishing self-reliant ventures, enforcing small and medium scale enterprises [SMEs] as well as advancing the industrial sectors among others using effective and efficient Technical Vocational Education and Training (TVET). TVET programme has been embraced as an educational system with the capacity of ending the proliferating unemployment in many nations (UNESCO-UNEVOC, 2018). The targeted termination, or reduction to the barest minimum, of unemployment is achievable in TVET providences of sustainable livelihood and socio-economic development, poverty alleviation, job creation (Agomuo & Enang, 2015), wealth creation, enterprise and national productivity among others.

Although TVET has been integrated into technical colleges and tertiary levels of education in Nigeria, the desired results of providing trained manpower with technical knowledge and skills for agricultural, commercial and economic development, which ultimately should lead to individual and national self-reliance is still a mirage (FGN, 2013). Challenging TVET outcome is majorly funding (facilities, manpower and trainings) (Applied Educational Systems and Technologies Associates [AESTA], 2018; Wahba, n.d). While funding solutions are proffered by many researchers, it has been generally accepted that government alone cannot offer the needed footings for a properly positioned TVET (AESTA, 2018). This is because of the initial capital, recurrent finances, and massive cost of equipment required ensuring turn-out of job-ready graduates. This necessitates effective TVET institutions and industries partnership which most literatures refer to as Public Private Partnership [PPP] (AESTA, 2018; Agomuo & Enang, 2015; Bakare, Amenger & Tiough, 2015; Oki, 2015).

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Partnership connotes a-two-way lending of variant supports by two or more bodies towards achieving most times a mutually benefiting goal. PPP according to OECD in Bakare, Maashin, and Momngu (2015) is a long-term agreement between the government and private partners where the service delivery objectives of the government are aligned with the profit objectives of the private partner. In this case, partnership serves a way of delivering and funding public services, such as providing infrastructure and other services, using a capital asset, where project risks are shared between the public and private sectors (Oki, 2015). Partnership in the context of this study refers to the collaborative efforts of TVET institutions and industries to provide best practices to TVET students in order to produce marketable and demand-driven workforce. According to Bakare *et. al* (2015), industries are private sector establishments owned by a person or group of persons with capacities to assist in providing: financial assistance, students trainings and special trainings to staff of TVET programmes for the purpose of inculcating relevant and up-to-date knowledge, skills and attitudes. On the other hand, TVET institutions refer to both technical colleges and tertiary institutions that offer training programme in either or all of the following areas: Automobile trades, building and woodwork trades, business trades, computer trades, electrical/electronic trades, hospitality trades, mechanical trades, printing trades (creative art/design), textile trades, and agricultural trades, who are by the stipulate of the national policy on education mandated to operate production units and consultancy services respectively in skill sufficient areas.

Production units connotes a school set up where the making, fixing and repairing of equipment, tools, products as well as rendering of services in smaller measures take place. School production unit is more like a miniature of a giant company in specific product or service line. According to Chukwu and Omeje (2017) school production unit refers to a portion or part of the school workshop/laboratory where materials and human inputs are combined for the creation of goods, items or provision of services. It is an industrial sector of the technical colleges where students work under the supervision of qualified instructors to make/maintain household goods/products and other allied technical services (Ogumbe, 2015). Qualified instructors in this study encompass TVET teachers and instructors in TVET technical colleges and Lecturers and technical staff in TVET higher institutions. In higher institutions of learning (Colleges of Education, Polytechnics, Monotechnics and Universities), school production units are referred to as consultancy services.

Consultancy services are industry specific small businesses with the aim of assisting clients in grassroot development of skills, products, services, innovations and best practices for improved output. Being industry specific, consultancy services are defined based on the services rendered. For instance, with reference to computer services, Kirby & Dylan (1997) defined consultancy services as professional advice and assistance in computer systems analysis, design and engineering, program development, coding, debugging, custom-built design and implementation linked with building, testing and documentation of a complete onsite computer system aimed at meeting a user's specific requirements. Also, Chell *et. al* in Kirby and Dylan (1997) defined technical consultant as someone skilled in the craft of a particular industry or industries with understanding of technical terms, details and methods associated with the industry’s functional operations and could therefore make recommendations of suitable courses of action to alleviate the problem(s) of clients in order to bring about the improvements in the operations of their business. Thus, consultancy services as expected in TVET tertiary institutions refer to high-level research-based professional business establishments catering for the development of small and medium scale enterprises (SMEs), providing professional and technical support in products development and improvement as well as providing platform for efficient partnership with technologically intensive industries. Consultancy services are institutional based business enterprises with dual purposes of adding value to students’ training and skill acquisitions as well as returning cost on investment through improved revenue and efficient supply of industries’ demands. Kirby and Dylan (1997) observed that one source of appropriate expertise available to technology-based industries is the academe who eventually deliverunder the auspices of consultancy services.

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Thus, school production units or consultancy services serve great role in TVET institutions including: birthing creativity and innovations, synergizing theory and practice, providing on-the-job training to students, certifying students for graduation in skilled areas (FGN, 2013; Ogumbe, 2015; Ananda & Mukhadis, 2016). According to Chukwu and Omeje (2017), effective school production units / consultancy services would provide: students industrial work experience platform, reverse brain drift, improve internally generated revenue of TVET institutions towards sustainable funding, make curriculum more relevant, provide employment to both graduates and indigent students, serve as ground for PPP etc. However, partnership between TVET institutions and industries enabled by school production units or consultancy services has much more benefits. AESTA (2018) stated that partnership of TVET institutions and industries is simply the way forward in addressing skill mismatch between available jobs and skills of TVET graduates as it involves the industries in both creating performance standards, training and assessment and equally serve as basis for applied research, industrial visitations among others benefits.

Partnership between TVET institutions and industries is supposed to be beneficial to both parties and not one-sided. For instance, PPP is important as it aids in achieving improved service delivery with best practices, improved cost effectiveness, increased investment in public infrastructure, shared risks, prompt project delivery, leveraged access to researches and resources among others (Agomuo & Enang, 2015). In addition to the importance of PPP are: efficient design and management of TVET system, access to skill upgrading and quality new skills development, economic growth and life improvement, financial support, standardization of skills, improved enterprises and self-employment (AESTA, 2018). But what is the benefits of the funding industries?

Funding organizations of TVET are both governmental and non-governmental. Agomuo and Enang (2015) stated that TVET has partners such as UNESCO, Bureau for Regional Education Development in Africa; Africa Development Bank (AfDB); United Nations Development Programme (UNDP); International Labour Organisation (ILO) at policy, training, design and development levels. Other private sectors according to Oki (2015) include: Samsung NLNG, Co-Creation Hub and Oracle, Rt. Briscoe Plc and Highbury College UK among others. These funders facilitated the acquisition of then up-to-date equipment that are fast becoming obsolete without much meaningful usage. However, by equipping some privileged TVET institutions like Faculty of Vocational and Technical Education, University of Nigeria, Nsukka, it is expected that the equipment would facilitate the setting up of SMEs first in the institutions which would ultimately improve TVET quality and properly match skills demand and supply. It is unfortunate that many TVET institutions have not seen partnership with industries beyond facility, manpower and training provision but have perceived hinderances to establishing a viable production unit or consultancy service.

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Challenges are part of every human endeavour. According to Chukwu and Omeje (2017), setting up school production unit / consultancy service would be challenged by non-availability of seed capital, capability of the manpower available for take-off and issues surrounding modalities of operation. However, the abilities of TVET teachers and lecturers in assessing the affordance of the available equipment and abundant resources within their environment would suffice the immediate challenges. Therefore, in view of the increasing unemployment rate in Nigeria, insufficient funding of TVET programmes, poor TVET quality resulting to lag in skill supply, this study is set to determine how partnership between TVET institutions and industries could be strengthened using school production units / consultancy services as a strategy.

**Problem of the Study**

There are proves of supports from industries and other private sectors in TVET institutions, with the aim of supporting both the schools and the government. Funding no doubt is needed for effective TVET programme hence supports have majorly been in trainings and upgraded training equipment to ensure that theories are matched with hands-on skills needed in such areas. The trainings received by teachers and instructors, as well as the equipment if utilized innovatively can create small enterprises referred to as production units and consultancy services in technical colleges and tertiary TVET institutions respectively. School production units/consultancy services when established will ensure that the hypothesized functions of TVET programme in producing graduates with technical knowledge, attitude and skills for employment and self-reliance would be achieved. Thus TVET graduates would be job creators instead of being numbered amongst the unemployed and unemployable.

But, in many TVET institutions, the supplied equipment and machines are not been used to their full potentials, hence they occupy spaces and are worshipped without any tangible use throughout their functional and relevant lifespan. These equipments most eventually become obsolete after many decades of poor attention, lack of maintenance and no productive engagement. Furthermore, there is observable detached interests of the industries in relying on TVET for the supply of manpower hence the poor support and rejection experienced, training and retraining of recruited masses in industries among other effects.

The inability of TVET institutions to establish production units and consultancy services has many implications on the graduates and the programme. For instance, how can TVET institutions close the skill gap between demand and supply without functional bases for matching theory with practice in schools? How can work specific skills, enterprise and self-reliance abilities be imparted by schools who reject efforts of being productive and self-reliant, and engage students in projects of no impact or benefits? How can industries continue to fund TVET institutions without benefits? Accordingly, if graduates are expected to be job creators in SMEs and future industry-giants, the institutions of learning need show them the process to forming and developing this ideology. Thus, the specific purposes of this study were to ascertain: areas of school production units/consultancy services functional in TVET institutions; ways of enhancing TVET institutions and industries partnerships using school production units/ consultancy services, and the challenges hindering the establishment of school production units / consultancy services in TVET institutions. The researchers formulated three research questions aimed at addressing the purpose of the study.

1. What areas of school production units / consultancy services are functional in TVET institutions?

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1. In what ways can school production units / consultancy services enhance the partnership between TVET institutions and industries?
2. What are the challenges hindering the establishment of school production units / consultancy services in TVET institutions?

**Hypotheses:**

**Ho1** There is no significant difference between the responses of Technical College Teachers and University Lecturers on the ways of enhancing partnership of TVET institutions and industries using school production units or consultancy services.

**HO2** There is no significant difference between Technical College Teachers and University Lecturers on the challenges hindering the establishment of school production units/ consultancy services in TVET institutions.

**Methodology**

The study adopted a descriptive survey research design. Survey design was necessary as the study sought opinions of TVET Teachers and Lecturers on ways of strengthening partnership affordances between TVET institutions and industries through school production units or consultancy services. The area of study was Enugu State, Nigeria; comprising 27 secondary and 6 tertiary TVET institutions. The population for the study was 260 teachers and lecturers in 5 technical colleges and 2 tertiary institutions within three different major towns in Enugu State namely Udi, Nsukka and Enugu metropolis. The sample size was statistically determined using Taro Yamane formula for finite population; hence, simple random sampling was used to select the 158 respondents used for the study (Yamane,1967). The instrument used for the study was a structured questionnaire, validated by three professionals in TVET programmes. The questionnaire has two sections: A and B; section A elicited demographic information of the respondents while section B had 66 item statements that sought information to answer research questions 1, 2 and 3. In Section B, question 1 sought responses of TVET teachers and lecturers on functional areas of school production units / consultancy services in their institutions with responses of *Functional = 2 and Not Functional = 1;* the responses to question 2 and 3 addressing way of enhancing partnership and challenges of production units / consultancy services, were designed based on 4-point scale with responses of: *Strongly Agree, SA = 4; Agree, A = 3; Disagree, D = 2;* and *Strongly Disagree, SD= 1*.

Data collection was carried out by the researchers through direct instrument administration and collection. However, out of the 158 copies of instrument distributed, only 114copies were duly completed and returned, representing 72% return rate upon which data analysis was based. The researchers used SPSS version 21 to manage and analyze the data. Data collected were analyzed using simple percentages for the demographic information and research question 1, while mean and standard deviation were used to answer research questions 2 and 3. T-test was used in testing the two null hypotheses at 0.05 level of significance. Based on the 4-point rating scale, the mean of the scale is 2.50. Therefore, mean scores of 2.50 and above were regarded as indication of ‘Agreed’, while mean scores below 2.50 were regarded as ‘Disagreed.’ Any item where the p-value is greater than 0.05, the hypothesis of no significant difference was upheld at 0.05 level of significance; but where the p-value is less than 0.05, the hypothesis of no significant difference was rejected.

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**Results**

**Table 1:** Descriptive Statistics on the Demographic Information of the Respondents

|  |  |  |  |
| --- | --- | --- | --- |
| **Class** |  | ***N*** | ***Percentage (%)*** |
| **Institution** | Technical College | 44 | 38.6 |
|  | Tertiary | 70 | 61.4 |
| **Gender** | Female | 36 | 31.6 |
|  | Male | 78 | 68.4 |
| **TVET Area** | Agricultural Education | 9 | 7.9 |
|  | Business Education | 15 | 13.2 |
|  | Computer Education | 14 | 12.3 |
|  | Building & Woodwork | 26 | 22.8 |
|  | Electrical / Electronic | 18 | 15.8 |
|  | Home Economics | 11 | 9.6 |
|  | Metal Works / Automechanics | 14 | 12.3 |
|  | Creative Arts | 5 | 4.4 |
|  | Others | 2 | 1.8 |

Table 1 presents the demographic information on the respondents. It shows that 44 respondents, representing 38.6% were from technical colleges while 70 respondents being 61.4% were from tertiary institutions. Also, there were 36 females with 31.6% and 78 males 68.4% involved in the study. In the TVET areas covered, Agricultural Education showed 9 respondents, with 7.9%; Business Education, 15 respondents occupying 13.2%; Computer Education had 14 respondents with 12.3%; Building and woodwork grouped together had 26 respondents with 22.8%; Electrical/Electronic had 18 respondents with 15.8%; Home Economics had 11 respondents which occupied 9.6%; Metal works and Automechanics had 14 respondents with 12.3%; Creative Arts, 5 respondents with 4.4% and other areas not initially captured were indicated by 2 respondents which occupied 1.8%. The results indicated a wider coverage and inclusion of TVET personnel across different areas of TVET. The coverage helps in getting a clearer picture of the functionalities of school production units / consultancy services across skill areas.

**Table 2:** Percentage Responses of Teachers and Lecturers on the Functional Areas of Production Units / Consultancy services in TVET institutions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **School Production Units / Consultancy Services** | ***N*** | ***F***  ***(%)*** | ***N*** | ***NF***  ***(%)*** |
|  | Poultry farms | 73 | (64.0) | 41 | (36.0) |
|  | Feed Production | 0 | (0.0) | 114 | (100) |
|  | Animal husbandry | 29 | (25.4) | 85 | (74.6) |
|  | Fishery | 72 | (63.2) | 42 | (36.8) |
| ***Chukwu, Daniel Uchenna& Hyginus Osita Omeje*** | Agro-processing | 33 | (28.9) | 81 | (71.1) |
|  | Marketing | 47 | (41.2) | 67 | (58.8) |
|  | Salesmanship | 0 | (0.0) | 114 | (100) |
|  | Book / Store keeping | 36 | (31.6) | 78 | (68.4) |
|  | Tourism | 3 | (2.6) | 111 | (97.4) |
|  | Leather good manufacturing and repair | 0 | (0.0) | 114 | (100) |
|  | Cosmetology | 0 | (0.0) | 114 | (100) |
|  | Clothing and textile | 73 | (64.0) | 41 | (36.0) |
|  | Dying and bleaching | 0 | (0.0) | 114 | (100) |
|  | Garment making | 33 | (28.9) | 81 | (71.1) |
|  | Catering craft practice | 76 | (66.7) | 38 | (33.3) |
|  | Data processing | 69 | (60.5) | 45 | (39.5) |
|  | Hardware maintenance | 73 | (64.0) | 41 | (36.0) |
|  | Software development | 68 | (59.6) | 46 | (40.4) |
|  | Electrical installation and maintenance work | 34 | (29.8) | 80 | (70.2) |
|  | Radio, TV and Electronic Servicing | 48 | (42.1) | 66 | (57.9) |
|  | GSM maintenance and repairs | 0 | (0.0) | 114 | (100) |
|  | Block laying, brick laying and concrete work | 0 | (0.0) | 114 | (100) |
|  | Painting and decorating | 0 | (0.0) | 114 | (100) |
|  | Plumbing and pipe fitting | 0 | (0.0) | 114 | (100) |
|  | Machine woodworking | 70 | (61.4) | 44 | (38.6) |
|  | Carpentry and joinery | 72 | (63.2) | 42 | (36.8) |
|  | Furniture making | 70 | (61.4) | 44 | (38.6) |
|  | Upholstery | 30 | (26.3) | 84 | (73.7) |
|  | Auto body repair and spray painting | 0 | (0.0) | 114 | (100) |
|  | Auto Electrical work | 29 | (25.4) | 85 | (74.6) |
|  | Auto mechanical work | 41 | (36.0) | 73 | (64.0) |
|  | Auto spare parts merchandising | 0 | (0.0) | 114 | (100) |
|  | Air conditioning and refrigeration | 1 | (0.9) | 113 | (99.1) |
|  | Welding and fabrication engineering craft practice | 5 | (4.4) | 109 | (95.6) |
|  | **Average percent of overall items** | **(27.99)** | | **(72.01)** | |

Key: N = number of respondents; F = Functional; NF = Not Functional

The data in Table 2 showed the functional and non-functional production units / consultancy services in TVET institutions. The table revealed that while poultry farms, fishery, clothing and textile, catering craft practices, data processing, hardware maintenance, machine woodwork, carpentry and joinery as well as furniture making were functional in greater percentages, areas such as: feed production, salesmanship, cosmetology, leather good manufacturing and repair, GSM maintenance and repair etc. were not functional at all in all the institutions involved. Moreover, the average percent of the overall items indicated that 27.99% of the school production units / consultancy services were functional while 72.01% were not functional. The poor functionality record indicated poor interests of institutions in engaging in production units and consultancy services for effective skill delivery.

**Table 3:** Mean, Standard Deviation Ratings and T-test Results of the ways of enhancing TVET Institutions and Industries Partnership using School Production Units / Consultancy Services

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Ways of Enhancing TVET Institutions and Industries Partnership using School Production Units / Consultancy Services** | ***N*** |  | ***SD*** | ***Rem.*** | ***t-cal*** | ***Sig.*** | ***Rem.*** |
| 1. | Synergize theory and practice | 114 | 2.96 | 0.96 | A | -0.98 | 0.33 | NS |
| 2. | Provide on-the-job training to students | 114 | 3.11 | 0.77 | A | -0.49 | 0.62 | NS |
| 3. | Certify students’ skill adequacy for graduation in both organizations | 114 | 3.16 | 0.76 | A | 1.00 | 0.32 | NS |
| 4. | Link institutions with industries’ master tradesmen | 114 | 2.90 | 0.62 | A | 2.12 | 0.04 | S |
| 5. | Provide opportunities for collaboration with industries and between institutions | 114 | 3.21 | 0.66 | A | -1.39 | 0.17 | NS |
| 6. | Create platform for industries’ idea infusion in TVET | 114 | 3.08 | 0.73 | A | -1.73 | 0.09 | NS |
| 7. | Allow industries exploration of schools and graduates | 114 | 3.52 | 0.58 | A | -1.74 | 0.08 | NS |
| 8. | Address skill mismatch in demand and supply with industries at the core | 114 | 3.46 | 0.58 | A | -2.34 | 0.02 | S |
| 9. | Provide more SIWES places for students in both organizations  ***Chukwu, Daniel Uchenna& Hyginus Osita Omeje*** | 114 | 3.38 | 0.54 | A | 0.21 | 0.83 | NS |
| 10. | Provide employment to many students especially on part time | 114 | 3.27 | 0.71 | A | -0.55 | 0.58 | NS |
| 11. | Generate marketable products for sustainable income in TVET institutions | 114 | 2.86 | 1.00 | A | 2.31 | 0.02 | S |
| 12. | Provide avenue for graduates’ internship and retraining | 114 | 3.28 | 0.63 | A | -0.20 | 0.84 | NS |
| 13. | Improve TVET quality and service delivery | 114 | 3.49 | 0.55 | A | -0.13 | 0.89 | NS |
| 14. | Increase investment in TVET institutions | 114 | 3.28 | 0.68 | A | 1.80 | 0.07 | NS |
| 15. | Affords opportunities for applied researches relevant to industry | 114 | 3.53 | 2.93 | A | 1.13 | 0.26 | NS |
| 16. | Apply cost recovery and efficient customer service | 114 | 3.33 | 0.57 | A | -0.11 | 0.91 | NS |
| 17. | Afford avenue for demand driven and market responsive TVET programme | 114 | 3.39 | 0.66 | A | -0.77 | 0.45 | NS |
|  | **Overall Results** | **114** | **3.25** | **0.25** | **A** | **0.45** | **0.65** | **NS** |

**Key:** *N = Number of Respondents; SD = Standard Deviation; Rem. = Remark; T-cal = Calculated t-value; Sig. = Significant p-value; df = (2,112)*

The results in Table 3 shows the mean, standard deviation ratings and t-test analysis of the ways of enhancing partnership of TVET institutions and industries using school production units or consultancy services. The table showed that all 114 respondents agreed that these affordances are important, hence the mean responses were all above 2.5 benchmark. Also, the cluster mean showed mean score of 3.25 and standard deviation of 0.25 which indicated a high level of agreement and closely related responses from the teachers and lecturers.

Similarly, the researchers examined whether there is a significant difference in the responses of Lecturers and Teachers on the ways of enhancing partnership of TVET institutions and industries using school production units or consultancy services. The data in table 3 shows the t-test analysis of the items and the overall result showed p-value (0.45) greater than 0.05, at 0.05 level of significant and 112 degree of freedom, therefore the null hypothesis was upheld. Hence, there is no significant difference between the responses of Technical College Teachers and University Lecturers on the ways of enhancing partnership of TVET institutions and industries using school production units or consultancy services.

**Table 4:** Mean, Standard Deviation Ratings and T-test Results of the Challenges Hindering the Establishment of School Production Units / Consultancy Services in TVET Institutions

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Challenges of School Production Units / Consultancy Services** | ***N*** |  | ***SD*** | ***Rem.*** | ***t-cal*** | ***Sig.*** | **Rem.** |
|  | Lack of organizational vision for productivity | 114 | 3.39 | 0.63 | A | -1.11 | 0.27 | NS |
|  | Poor perception of school production units / consultancy services | 114 | 3.36 | 0.65 | A | 0.24 | 0.81 | NS |
|  | Lack of basic equipment in relevant areas | 114 | 3.47 | 0.61 | A | -1.63 | 0.11 | NS |
|  | Lack of manpower to drive the establishment | 114 | 3.24 | 0.66 | A | 0.42 | 0.68 | NS |
|  | Perceived extra labour or burden on staff members | 114 | 3.12 | 0.78 | A | 0.59 | 0.55 | NS |
|  | Lack of interest in running establishment | 113 | 3.20 | 0.85 | A | -0.46 | 0.64 | NS |
|  | Lack of skills needed for SME | 114 | 3.12 | 0.87 | A | 1.19 | 0.24 | NS |
|  | Insufficient fund for seed capital | 114 | 3.27 | 0.88 | A | 0.21 | 0.83 | NS |
|  | Comfortability with the status quo | 114 | 2.93 | 0.85 | A | 1.81 | 0.07 | NS |
|  | Time management issues | 114 | 3.03 | 0.83 | A | 0.50 | 0.62 | NS |
|  | Problem of income disbursement | 114 | 3.32 | 0.79 | A | 3.27 | 0.00 | S |
|  | Perceived problems of integrating industries in TVET programmes | 114 | 2.96 | 0.94 | A | -0.11 | 0.91 | NS |
|  | **Overall Results** | **114** | **3.20** | **0.32** | **A** | **1.06** | **0.29** | **NS** |

**Key:** *N = Number of Respondents; SD = Standard Deviation; Rem. = Remark; T-cal = Calculated t-value; Sig. = Significant p-value; df = (2,112)*

Table 4 shows Mean, standard deviation and t-test analysis of the responses of teachers and lecturers on the challenges hindering the establishment of school production units or consultancy services. Table 4 showed that all the 12-items had mean responses above 2.5 benchmark, hence the respondents agreed to the challenges hindering the establishment of school production units or consultancy services. Also, the overall results indicated a cluster mean of 3.20 with 0.32 standard deviation, showing a total agreement with no much line of deviations.

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Table 4 also showed the t-test analysis of the null hypothesis which states that there is no significant difference between Technical College Teachers and University Lecturers on the challenges hindering the establishment of school production units / consultancy services in TVET institutions. Also, the data in Table 4 reveals the t-test analysis of the items and the overall result showed p-value (0.29) greater than 0.05, at 0.05 level of significant and 112 degree of freedom, therefore the null hypothesis was upheld. Hence the null hypothesis was not rejected.

**Discussion**

The findings of this study revealed that there are few personnel in the various TVET skill areas hence many a skill option lament of insufficient manpower. The findings are in line with Usman and Abiodun (2009) who stated that among the needs of TVET institutions is staff needs for proper delivery in skill areas.

Furthermore, the findings of the study revealed that 72.01% of the supposed functional school production units / consultancy services are not functional, instead, only 27.99% were agreed to be functional, whose extent of functionality is yet to be ascertained. The non-functional production units or consultancy services account for total dependence on government for finances which has crippled efforts towards alternative sources of TVET funding. In support, Ayonmike, Okwelle and Okeke (2015) and Ezemma (2017) agreed that consultancy services and production centres if functional, can serve as sustainable financing strategies for TVET.

Similarly, the study showed that leveraging on production units / consultancy services can aid partnership of TVET institutions and industries in many ways and this assertion was agreed to by all TVET stakeholders involved in the study. Hence the result of hypothesis one showed that there is no significant difference between Technical College Teachers and University Lecturers on the ways of enhancing partnership of TVET institutions and industries using school production units or consultancy services. Among the ways are to allow the industries to explore the school and graduates, linking institutions with industries’ master tradesmen, provide opportunities for collaboration with industries, creating platform for industries idea infusion into TVET among others. These strategies, if implemented, according to Chukwu and Omeje (2017) would clear the misunderstanding between industries and TVET institutions and provides a level playing ground for proper linkage/partnership of TVET institutions and industries. According to Ezemma (2017) disparity of school theory and industries’ practice is a proof of lack of synergy which production units / consultancy services afford.

**Conclusion**

The purpose of this study is to determine ways of strengthening partnership affordances between TVET institutions and industries through school production units / consultancy services. Three research questions guided the study: one, was to determine the areas of school production units / consultancy services functional in TVET institutions; secondly, to determine what ways school production units / consultancy services can be used to enhance the partnership between TVET institutions and industries; andthirdly, to ascertain the challenges hindering the establishment of school production units / consultancy services in TVET institutions. In order to answer these questions, a 66-item questionnaire designed by the researchers was adopted as instrument and was administered to 158 participating TVET Teachers and Lecturers randomly selected from 7 institutions in Enugu State, Nigeria.

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In conclusion, it was discovered that many TVET institutions have no functional school production unit / consultancy services. However, the diverse ways of using school production unit / consultancy service to foster partnership of TVET institutions and industries were all accepted, knowing that if implemented will strategically position TVET institutions to partner more effectively with industries, affording both parties return on investments. The poor attention given to the establishment of school production units / consultancy service hinges on many challenges including poor perception and lack of interest among TVET institutions staff members, perceived extra labour, insufficient fund for seed capital, comfortability with status quo, time management issues, issues of income disbursement among others. It is therefore imperative that the partnership between TVET institutions and industries be enhanced through school production unit / consultancy service to terminate overdependence on government and create a means of synergizing theory with practice to end skill mismatch and generate sustainable revenue for TVET institutions. This is certainly the desired best practice!

**Recommendations**

Based on the findings of the study, the following recommendations were made:

1. More school production units / consultancy services should be established in TVET institutions if the quests for matching skill demand and supply as well as attaining self-sustenance will be realized.
2. TVET institutions should be given a part to play in the funding of the programme, so as to enable the institutions think outside the box in order to create sustainable internal revenue recollection and linkage to similar industries through production units / consultancy services.
3. There should be employment of more staff in diverse areas of TVET to ensure manpower availability.
4. TVET institutions should be provided with seed capitals and basic equipment by both government and donor agencies in line with the intended skill area to help them take-off on establishing production units / consultancy services.

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**THE ROLE OF OPEN AND DISTANCE LEARNING IN VOCATIONAL TRAINING AND AGRICULTURAL EDUCATION**

**BY**

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**Abstract**

*The popularity and recognition of Open and Distance Learning (ODL) educational system is increasing day by day, the ODL programme is flexible and learner friendly especially to those who could not get access to formal educational system. ODL is more cost effective and take place while continuing full-time employment as well learning vocational agricultural education. Vocational agricultural education provides individuals or the society with basic or essential agricultural knowledge and skills to innovate them explore the environment for the betterment of the whole society or nation. Vocational agricultural skills are necessary for economical, commercial growth and national development. The vocational agricultural education deals with the skills necessary for ensuring high-level production in farming business. This paper pointed out the objective of vocational agricultural education, concept of Open and Distance Learning and the role of vocational agricultural education through ODL.*

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| --- |
| **Keywords:** Distance Learning, Vocational Agricultural Education, National Open University |

**Introduction**

Open and distance education in Nigeria has played a tremendous role in human development and socio-economic growth of the country. Education is the bedrock to every development, an instrument of political stability, and industrial advancement. It is about human capacity building and capability improvement. Education inculcates in humans values that help inform their characters, attitudes and behaviour as they contribute positively to the development of their communities. The establishment of open and distance education in Nigeria was permitted in order to give society’s under-privileged individuals the possibility of accessing education. It is a type of education that helps inform those individuals about life especially when vocational education is involved.

Vocational education is any form of education designed to imbue individual with the right type of knowledge, skills, and attitudes for specific occupations (Nwankwo, 2000). Those who undergo vocational education are assumed to have already chosen their life occupations and thus need all necessary trainings to acquire relevant skills and knowledge to enable them progress and develop in such occupations. Vocational agricultural education is concerned with the development of skills; knowledge and attitude in the field of crop or animal production to enable the recipients take up a career in such direction. It is responsible for preparing individuals in various agricultural occupations such as growing crops, rearing animals, providing ornamental horticulture, managing farm business or resources (Ezeagu and Ezema, 2004).

According to Dipcharima (2004), vocational agricultural education provides individuals or the society with basic or essential agricultural knowledge and skills to innovate and explore the environment for the betterment of the whole society or nation. Vocational agricultural skills are necessary for commercial growth and national development. The vocational agricultural education deals with the skills necessary for ensuring high-level production in crop or animal enterprises especially when modern techniques are adopted. The use of modem techniques in the area of agricultural mechanization, application of fertilizer and management clearly demonstrate and encapsulate the curriculum of secondary and tertiary institutional so as to enable the students develop interest and acquire vocational skills (Agbulu and Ekele, 2004).

**Objectives of Open and Distance Learning through vocational Agric Education**

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According to Olaitan (2005), vocational agricultural education is the programme which inculcates the right attitudes, values, habits, abilities, understanding competences, leadership cooperation and citizenship needed for entry into agricultural occupation. However, the objectives of vocational agricultural education as contain in the Federal Republic of Nigeria; FRN, (2004) include the following:

**1. To provide an effective alternative path to wider opportunities in education and especially in higher education:**

There are different categories of potential learners. There are some who never been able to enter into any institution of higher learning. There are some who just need additional knowledge in a particular discipline. There are still others who are in need of refresher courses to cope with the latest development in their perfection (skills). This reflect the objectives of vocational agricultural education, to develop skills and have scientific knowledge and competencies required in crop or animal production. For all of those there is need for distance learning or correspondence education.

**2. To provide an efficient and less expensive education:**

Provision of universal schooling is beyond the means of our country. Increasing population and limited resources is the predicament of our educational planners. It is difficult to divert huge sums of money in a developing economy to match the required level of expansion for traditional schooling. Distance education is the only practical alternative.

**3. To provide education facilities to all qualified and willing persons:**

The objective of correspondence courses is to provide education facilities to all qualified and willing persons who are unable to join regular university and other courses due to various reasons. This objective improves individuals to develop an understanding and appreciation of career opportunities in agricultural occupation and preparation required to progress in agricultural business and other careers in agriculture.For them, there is an incessant search for an alternative system and that system is distance education.

**4. To provide opportunities of academic pursuits to educated citizens willing to improve their standard of knowledge:**

There are many learners, both young and adults, who cannot afford to join the face-to-face system of education due to personal and professional responsibilities. For such type of persons, some provisions have to be made through distance education. Hence, the objective is to provide opportunities to improve the standard of knowledge and learning through continuing education while in employment. This will encourage individuals to develop the ability to secure satisfaction in the placement and advancement in agricultural occupation through programmes on continuing education.

**5. To provide education facilities to those individuals who look upon education as a life-long activity:**

Distance education facilities are needed for those individuals who look upon education as a life-long activity or to acquire knowledge in a new area. This can equally provide the technical knowledge and vocational skills necessary for agriculture, commercial and economic development, because life­long education is emphasized for all stages of life. In this context, the report of the National Policy on Education, 1986 is worth- mentioning here.

The NPE-1986 says, “Life-long education is a cherished goal of the educational process. This presupposes universal literacy. Opportunities will be provided to the youth, housewives, agricultural and industrial workers and professionals to continue the education of their choice, at the pace suited to them. The future thrust will be in the direction of open and distance learning. ” this signifiers the role of ODL can never be over emphasis.

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**Role of Open and Distance Learning in Vocational Agricultural Education**

Open and Distance Learning is increasingly becoming popular because of its flexibility and learners’ friendly approach particularly to those who could not get access to the regular conventional systems. ODL has the potential to produce skilled workforce and reach the un- reached and even the marginalized and excluded group of individuals in the society. (Bashir & Abubakar 2018)

1. According to Fozdar (2009), ODL institutions have diverted attention towards improving skills of teachers and industrial workforce through in-service training and skills development programmes. Fozdar further submitted that, ODL institutions do not only impart knowledge in alternative to conventional educational system but also in the area of technical vocational education and Training.
2. Modern technology; ODL laid emphasis on the use of machinery and other equipment like tractor, cultivator ridges, planter, and combined harvester to replace the old tools like hoe and cutlass.
3. Cost effective; Distance education is more cost effective and can take place while continuing full-time employment (Moran and Rumble, 2004). These signifiers that a learner undergoing ODL programme can still go on with his/her normal day routine or business, People from remote areas are not excluded and they are predominantly agrarians practicing agriculture with little or no knowledge of modern vocational agricultural education (Abubakar 2013).
4. Flexibility; the Open and Distance Learning mode institution plays an important role by providing flexible and cost effective vocation agricultural programme with a short duration, the idea here is to educate people on specific areas that can create skill and capacity building for example the university of Krishna kanta headiqui state open university India, has introduced a 1 year BPP programme as well certificate course on Scientific Piggery farming (CSPF), Commercial Goat Rearing (CCGR) and Commercial Layer farming (CCLF) and Commercial Duck Farming (CCDF) (Sarkar,2015).
5. Access to global resources and expert via internet communication and internet resource.
6. Formal education system; Formal educational system alone cannot meet the need for continuous learning and training opportunities especially with the inability of candidates to get admitted into regular convention universities in Nigeria. This call for strengthening of ODL programmes to accommodate more candidates. Thus, skill based programmes can be implemented through ODL mode as it is an effective way of providing education for the development of skills required for an untrained workforce (Sarkar, 2015).

**Problems Facing ODL through Vocational Agricultural Education in Nigeria**

Vocational agricultural education though has every potentiality to facilitate the growths and development of any growing nation as is elaborated above, is besieged with numerous problems in the developing nation, which have hindered its true upliftment of their economy, Usman (2006). Some of these problems include:

1. **Appropriateness and Efficacy:** There is a misconception that ODL is an inappropriate mode for imparting technical and vocational skills. Conversely though, Fozdar and Kumar (2008) view ODL most appropriate for post-secondary technical and vocational level studies. According to them, this is because technical and vocational studies often comprise of much greater cognitive and theoretical components that better lend themselves to distance learning methodology.
2. **Quality and Standard:** There are concerns among many potential participants and students that ODL is a “second best” option. There are also concerns relating to the quality of offerings and qualifications obtained especially with the proliferation of online education platforms. Also, societal attitude towards Vocational Agricultural Education, There are the genera negative belief among many people that vocational agricultural education is meant for those who do not have the brainpower for vigorous academic demands of the traditional secondary schools system. To those who bold this view and belief, they think that the vocational school leavers are 'drop-outs1 or 'never do-wells' who can only learn skills for vocation.

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1. **Lack of consistency in vocational agricultural programme/policy implementation:** It is a known fact that success in any educational policy is contingent on the involvement of all stakeholders and sponsorship of funding agency, that is, the government. A succeeding government truncated the attempt at Open University in the early 80’s. Thus, successive governments in Nigeria must not only allow the continuation of open and distance education programme, it must be supported through adequate fund.
2. **Digital Divide and inadequate infrastructure:** There is an inequitable access to information and telecommunications technology (ICT) between the developed and developing countries. The potential of ODL to expand access to vocational agricultural education will be increasingly predicated upon finding ways to improve access to technology. The current levels of ICT infrastructure and access in most part of the country is poor. This lack of basic infrastructure limits the options for ODL delivery models.
3. **Inadequate Equipment and Tools for Vocational Agricultural Education:** While there is increase in the number of students enrolment into ODL institutions to study vocational education, but there is no proportionate increase in the provision of equipment and tools necessary for effective teaching (Ulinfun, 1990).
4. **Expanding existing ODL institutions**, establishing new ones to cover each state in the country so that vocational agricultural education can be national, and providing facilities and spaces using reliable statistics of those needing higher education in Nigeria.

**Conclusion and Recommendation**

It is very obvious that Open and Distance Learning (ODL) are expected to contribute effectively to individual’s education especially those who could not get access to the formal vocational educational system. ODL is term as an alternative to conventional university is expected to lay much emphasis on skill, capacity building training, employable which are all vocational in nature. Vocational agricultural education programme in ODL is embedded with many problems such as appropriateness and efficiency, quality and standard, lack of consistency in VAE, inadequate equipment and tool for vocational agricultural education to avert to this problem the programme needs to be flexible and cost effective. The following are the recommendations;

1. Particular attention should be given to planning the development ODL programmes and expansion of vocational agricultural education by giving high priority to vocational education in national development agenda as well as in plans for educational reform.

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1. Policy for the structural improvement of vocational agricultural education should be established within the framework of broad policies such as National Policies on Education; National Development Plans, e.t.c Policy should be directed to ensuring quality so as to exclude discrimination between the different educational streams.
2. There is need to create more awareness in terms of enlightenment campaigns via intensified use of mass media on the importance of vocational agricultural education in any nation's technological advancement. By so doing, more people would come to appreciate vocational agricultural education as a veritable technological life-wire of our desired match towards technological breakthrough and by extension, there would be a change in societal negative attitude towards it and its product.
3. Adequate facilities should be in place to access information and telecommunications technology (ICT) between the developed and developing countries. The potential of ODL to expand access to vocational agricultural education will be increasingly predicated upon finding ways to improve access to technology.
4. Government should make funds available for ODL institutions and provide basic amenities such as electricity, labs, practical field to create conducive atmosphere for teaching, learning and training of vocational agricultural education. also funds should be available to ODL institutions to enable them organize workshops, seminars, research and sponsor their teachers on conferences and other training programmes on regular basis.

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**PRACTICAL SKILLS NEEDED BY NIGERIA CERTIFICATE IN EDUCATION (TECHNICAL) STUDENTS IN MACHINE SHOP OPERATIONS FOR BEST PRACTICES IN FEDERAL COLLEGE OF EDUCATION (TECHNICAL)GOMBE, NIGERIA.**

**BY**

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**Abstract**

*The main purpose of the study was to determine practical skills needed by Nigerian Certificate of Education (Technical) students in machine shop operations in Federal College of Education (Technical) Gombe State, Nigeria. Two research questions and two hypotheses guided the study. The design of the study was a descriptive survey research design. The area of the study was Gombe state in the North East geo-political zone of Nigeria. The population of the study was37 respondents; there was no sampling. The instrument used for data collection was titled “Practical Skills Needed for Machine Shop Operations Questionnaires”, (PSNMSOQ). The instrument was validated by three experts. The result obtained were then calculated by using Pearson’s product moment to obtain the reliability coefficient which was 0.76. The data generated from the study was analysed using Mean and Grand mean statistics. The findings of the study among others revealed that, Metalwork Students have little practical skills in Machine shop for fabrication operations, it was discovered that some Metalwork Students have little problems in identifying safety Precautions. It was also found that many Metalwork Students perform better in other skills items in Machine Shop Operations. Based on the findings of the study, the followings recommendations were made that Metalwork Lecturers should engage Metalwork Students with more practical work/assignment on Machine Shop operations. Metalwork Lecturers should supervise regularly during machine shop practical’s and give more*

**Keywords*:*** Machine shop, practical skills, metalwork, operations

**Introduction**

The traditional type of vocational education before the colonial masters was the apprenticeship system of education which provided the youths with employment and learning of specific skills/trades with the use of hands. Technical Education according to Federal Republic of Nigeria (FRN) (2014), is that aspect of education that leads to the acquisition of practical and applied skills as well as basic scientific knowledge. In order to achieve and attain the objectives of technical education, students should acquire the needed training from competent teachers to enable them perform better in the world of work so as to ensure that they are self-reliant. Technical Education is designed to provide theory and practical knowledge to individuals, and this type of training is provided to individuals who desire to work in an industry or commerce or in any set up that uses machinery and tools for their services (Yaya, 2016).

Technical education is offered in Universities, Polytechnics and Colleges of Education (Technical).The specific goals of technical education at the tertiary level are: -

a. Provide courses of instruction and training in engineering, other technologies, applied science, business and management, leading to the production of trained manpower.

b. Provide the technical knowledge and skills necessary for agricultural, industrial, commercial, and economic development of Nigeria.

c. Give training that impart the necessary skills for the production of technicians, technologists and other skilled personnel who shall be enterprising and self-reliant.

d. Train people who can apply scientific knowledge to solve environmental problems for the convenience of man, and

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e. Give exposure on professional studies in the technologies. (FRN, 2014)

The NCE (Technical) programme is a three-year teacher education programme in the Colleges of Education (Technical). According to National Commission for Colleges of Education NCCE (2012) NCE (Technical) programme curriculum contains various areas of specialization, such as Automobile Technology, Building Technology, Electrical/Electronic Technology, Metal work Technology and Wood work Technology. In addition, the National Commission for Colleges of Education (2012) identified the following as the objectives of NCE (Technical): -

* To produce qualified technical teachers and practitioners of technology capable of teaching introductory technology in the junior secondary schools.
* To produce qualified technical teachers motivated to start the much-desired revolution of technological development right from the Nigerian schools.
* To prepare technical teachers so as to qualify them for a post NCE, degree programme in technical education. (NCCE, 2012)

Metalwork Technology is one of the areas of specialization offered at the Nigerian College of Education (Technical) level as well as in some Polytechnics with a view to providing qualified metal work teachers. It is a practically oriented course designed to expose students, not only to the art of metalwork construction but also to the effective use of metalwork machine tools and simple maintenance on them NCCE (2012). Metalwork technology enables students to learn practical skills, which is both an integral part of the Nigeria certificate in education NCE (Technical) programme and a requirement for graduation.

Metalwork Technology Education includes the following courses: welding and fabrication, sheet metalwork, foundry and forging and metalwork, and machine tools practices. In metalwork technology there is metal workshop for conducting practical’s by making use of metal materials, hand tools, machine tools, andsafety materials/equipment etc. Metal work machine tools use for cutting, shaping, forming and finishing metals or other materials. According to Gupta and Khurmi (2010) machinetools which perform the material removal operation with tools, to produce desire shape and size of the work piece is known as machine tools. Some machine tools found in metalwork shop among others which students perform basics operations to learn practical skills mostly in fabrication work are drilling and grinding machines:

**Drilling Machine Operations**

The drilling machine is essential in any metal workshop. According to Gupta and Khurmi (2010) the basic purpose of a drilling machine is to drill cylindrical holes in workpiece (metallic and non-metallic materials). The holes are cut out of the materials with a cutting tool, which is known as drill. The drill is fixed in a rotating spindle and can be fed towards the workpiece which may be fixed to the table or to the base of the machine. The speed of the spindle and the feed can be adjusted according to the workpiece. Thedrillmost widely used is made from high speed steel. According to Sackey and Amoakohene (2007) there are different types and sizes of drilling machine used in metal workshops:

1. **Hand Drilling Machine:** This is operated manually or by electrical power, used for light work on a workpiece.

2. **Sensitive Drilling Machine:** This can be two types, one fixed on bench in the workshop and the other type always fixed on the floor in the workshop. Floor type is larger than the bench type, the only difference between the bench and the floor type is the length of the main column of that of floor type which is longer than that of bench type.

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3. **Radial Drilling Machine:** Is a moving axis machine which is suitable when large casting materials are to be drilled, it is very useful for big, heavy jobs. This is machine fed automatically that is it uses power to lower the drill.

4 **Pillar Drilling Machine:** This is also floor type similar to the Sensitive drilling machine. But it is stronger and robust than the sensitive type and can drill holes up to 4cm diameter.

5 **Multi Spindle Drilling Machine:** It has multi spindle connected to the main spindles and each spindle carries a drill and all rotate at the same time, so drilling many holes at a time. This type of drilling machine is useful in mass production not like other types mentioned above.

According to Sackey and Amoakohene (2007). There are so many operations which can be performed on the drilling machine. They include:

1. **Drilling:** The process of producing around hole into or through solid metal or materials with the aid of a drill which is attached to a drilling machine.
2. **Reaming:** Is a process of sizing an existing hole to a given diameter in order to obtain a very smooth and accurate hole.
3. **Boring:** Is an operation of enlarging a hole that has been drilled by a single point tool, so as to make it true to required size. Boring enlargers a hole to its full length.
4. **Counter Boring:** It is an operation of enlarging the mouth of a drilled hole to set bolt heads and nuts below the surface so that they may not project out from the surface level. It is done by a Counter boring tool. Counter boring enlarges for a small length in order to accommodate the heads of bolts, stud etc.
5. **Spot facing:** Is a process of providing a flat seating for nuts and washers around hole drilled in the rough surfaces of a metals.
6. **Counter Sinking:** Is a process of enlarging the top end of hole to the shape of a cone shape for the seating of flat head screw.

**Grinding Machine Operations**

Grinding machine is a machine playing an abrasive wheel for removing excess stock and at the same time producing a finish. According to John (1976), Sackey and Amoakohene (2007) grinding is the operation that removes material by rotating an abrasive wheel against the work. It is often for sharpening tools, removing material that is too hard to be machined by any other method or when fine surface finishes and close tolerances are required. There are three main types of grinding machine. The bench type has a lighter base on which the head is fixed and is often mounted on a table and the pedestal type consist of heavy cast iron pedestal (stand), with the grinding head fastened to top. The grinding machine operations are:

1. **Cylindrical Grinding:** In cylindrical grinding, the work is mounted between centres and rotates while in contact with the grinding wheel, straight, taper and form grinding can be done by this method.
2. **Centerless Grinding:** With centerless grinding, it is not necessary to support the work between centers as it is rotated against the grinding wheel. Instead, the piece is positioned on a work support blade and is fed automatically between a regulating or feed wheel which causes the work to rotate, and the grinding wheel which does the cutting.
3. **Internal Grinding:** Is done to secure a fine surface finish and accuracy on internal diameters. The work is held in a chuck and rotates. The revolving grinding wheel moves in and out of internal diameter.

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1. **Form Grinding:** In form grinding, the grinding wheel is shaped to produce the required design on the work. Thread grinding is an example of form grinding.
2. **Surface Plane Grinding:** This machine makes use of a reciprocating motion to move the works table back and forth under the grinding wheel.
3. **Surface Rotary Grinding:** The machine in this category have circular work tables which revolve under the rotating grinding wheel.

Thus, machine shop operations can only be achieved through constant practices, the more students carry out practical’s in machine shop operations the more they become proficient. This practice can be achieved through technical education whose purpose is production of technicians who can acquire practical and applied skills as well as basic scientific knowledge. Hence, technical education emphasizes on the development of abilities and skills necessary for the world of work.

**Statement of the Problem**

Despite the importance of producing skilled and competent personnel for technological development, the teaching and learning in some relevant technical institutions in Nigeria generally appear to be unsatisfactory. Therefore, there were complaints from private and public enterprises that the NCE (Technical) metal work technology students’ graduates are not performing very well in the area of metal work machine tools practical skills Abubakar (2011).

Mohammed (2006) observed that some final year students of metalwork give road side technicians to fabricate their final year practical projects for them and submit for assessment, also Aminu (2010) observed that most students offering metal work lack practical skill, thus they cannot perform competently, hence the focus of this study is practical skills needed of Nigerian Certificate in Education (Technical) students in drilling and grinding operations. The practical skills needed by NCE (Technical) students in machine shop specifically, drilling and grinding machine operations is a function of the quality training received from Metal work lecturers/teachers who are expected to be highly knowledgeable, skilled and capable of translating the curriculum content into action using the appropriate stages/steps. In most cases, the inability of the lecturers/teachers to utilize basic academic skills that comprise pedagogical skills, knowledge of the subject matter, (Both theory and practical) affect practical skills training.

In the light of the foregoing, it therefore become imperative to determine practical skills of NCE (Technical) students in drilling and grinding machine shop operations in Federal College of Education (Technical) Gombe states in order to address the specific areas of weaknesses so as to make necessary improvement in NCE (Technical) awarding institutions.

**Purpose of the Study**

The main purpose of the study was to determine practical skills needed by Nigerian Certificate of Education (Technical) students in machine shop operations. Specifically, the study sought to:

1. Identify the practical skills needed by NCE (Technical) Metalwork students in drilling machine operations.
2. Identify the practical skills needed by NCE (Technical) Metalwork students in grinding machine operations.

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**Research Questions**

The following research questions guided the study:

1. What are the practical skills needed by NCE (Technical) metalwork students in drilling machine operations?
2. What are the practical skills needed by NCE (Technical) metalwork students in grinding machine operations?

**Research Hypotheses**

The following null hypotheses tested at 0.05 level of significance guided the study;

H01: There is no significant difference in the mean responses of metalwork lecturers and students on the practical skills needed in drilling machine operations

H02: There is no significant difference in the mean responses of metalwork lecturers and students on the practical skills needed in grinding machine operations.

**Methodology**

A descriptive survey design was used for the study. According to Gall and Borg (2007) a descriptive survey design is a method of data collection using questionnaire or interview to collect data from a group or sample that has been selected to represent a population to which the findings of the data analysis can be generalized. The population for the study consisted of thirty-seven (37) respondents, comprising twelve (12) Metalwork Lecturers and twenty-five (25) final year Metalwork Students from the Federal College of Education (Technical) Gombe, Gombe State in 2016/2017 academic session in Metalwork Technology Department. The students were NCE III (technical) Students who registered Metal Work Technology for 2016/2017 academic session. Because of the small size of the population, the entire population was used for the study, and therefore, there was no sampling for this study. The instrument that was used for collecting the data for the study was a structured questionnaire, which was developed by the researcher. The instrument was titled “Practical Skills Needed for Machine Shop Operations Questionnaires. (PSNMSOQ)” The instrument consisted of 44 skills items that provided answers to the research questions raised.

A four-point rating scale was used to determine the level of training needed using the response options of Highly Needed (HN) = 4, Needed (N) =3, Not Needed (NN) =2 and Highly Not Needed (HNN) =1. There were 44 Skills items in the validated instrument (Questionnaire) and it yielded a reliability coefficient of 0.76 using a Pearson’s product moment correlation. Data was collected by using the instrument. The data collected for this study was analyzed using mean statistics to answer the two research questions in order to determine if Skills items are Needed or not Needed. The hypotheses were tested using Z-test at 0.05 level of significance. The data collected for this study was analyzedusing the Statistical Package for Social Science (SPSS) version 23. The two research questions were answered using the Mean Responses and Grand mean. The real limit of numbers was used for decision making, the real limits of numbers are:

3.50 – 4.49 Highly Needed (HN), 2.50 – 3.49 Needed (N), 1.50 – 2.49 Not Needed (NN)

0.50 – 1.49 Highly Not Needed (HNN). (Ogbu, 2004).

Therefore, any item with a mean of 2.50 and above responses was regarded as a Needed option, and any item whose mean falls below 1.50-2.49 was regarded as Not Needed option. If the calculated Z-value is less than critical Z-value or tabulated, the hypothesis was accepted, otherwise the hypothesis was rejected.

**Presentation of Result:**

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**Research Question 1: -**What are practical skills needed by NCE (Technical) Metalwork Students on drilling machine operations.

**Table 1: Mean Ratings on Practical Skills Needed of NCE (Technical) metalwork students and teachers on Drilling Machine Operations.**

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N** | **Skills in Drilling Machine Operations**  N1=12 N2=25 NT= 37 |  | **Remarks** |
| 1 | **Select and appropriate punch** | 3.50 | HN |
| 2 | Center punch the work piece to be drilled | 3.90 | HN |
| 3 | Mount work piece in machine vice for drilling operation | 3.77 | HN |
| 4 | Mount the drill into a spindle of the drilling machine and tighten with a chuck key | 3.90 | HN |
| 5 | Adjust the work table and align work center to drill center. | 3.78 | HN |
| 6 | Select the appropriate speed in relation to size of the hole and type of work piece | 3.78 | HN |
| 7 | Switch on the drilling machine and commence drilling operation | 3.75 | HN |
| 8 | Continuously apply appropriate cutting fluid. | 3.82 | HN |
| 9 | Feed in drill steadily into the work piece and occasionally raise it to break up chips | 3.50 | HN |
| 10 | Withdraw drill to check if desired depth is obtained | 3.83 | HN |
| 11 | Stop the drilling machine when desired depth is obtained | 3.83 | HN |
| 12 | When the drilling has been completed remove the work piece | 3.82 | HN |
| 13 | Tighten the work piece securely on the machine vice for counter sinking operation | 3.82 | HN |
| 14 | Center drill a work piece for countersinking operation | 3.73 | HN |
| 15 | Drill a work piece | 3.80 | HN |
| 16 | Align the center of counter sinking tool with the centre of the drilled hole | 3.85 | HN |
| 17 | Select and mount the appropriate tool for counter sinking | 3.85 | HN |
| 18 | Select a desirable speed for counter sinking operation | 3.82 | HN |
| 19 | Start the drilling machine for counter sinking operation | 3.75 | HN |
| 20 | Feed the counter sinking tool into the diameter of the drilled work piece | 3.65 | HN |
| 21 | Continue and applying cutting lubricant | 3.78 | HN |
| 22 | Check the diameter of the countersinking work piece when finished | 3.72 | HN |
| 23 | Switch off the drilling machine | 3.67 | HN |
| 24 | Remove the countersink work piece | 3.75 | HN |
| 25 | Tighten the work piece for counter boring operation | 3.68 | HN |
| 26 | Use drilling machine to carry out operation such as counter boring. | 3.80 | HN |
| 27 | Check the diameter of the counter bore work piece when finished | 3.70 | HN |
| 28 | Switch off the drilling machine | 3.73  3.73 | HN  HN |
| 29 | Remove the counter bore work piece |
| 30 | Operate correctly the drilling machine to carry out other basic drilling machine operation boring and reaming | 3.80 | HN |
| 31 | Observe safety precaution when using drilling machine for various operation | 3.58 | HN |

**3.76**

**Keys**:

N1 = Number of lecturers, N2= Number of students, HN = Highly Needed, N= Needed, NN= Not Needed,**=** Grandmean responses of lecturers and students.

Table 1: Shows that for practical skills needed in drilling machine operations. Metalwork students highly needed practical skills in all 31 skills items with grand mean ranging from 3.50 to 3.90. This indicates that all 31 skills items were highly needed for metal work students for Drilling machine operations.

**Research Questions 2: -** What are the Practical Skills Needed of NCE (Technical) Metalwork Students in Grinding Machine Operation?

*T***able 2:** Mean Ratings on Practical Skills Needed of NCE (Technical) metalwork studentsin Grinding Machine Operations.

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N**  ***Diraso, Sini & Yaya*** | **Skills Grinding Machine Operations** |  | **Remarks** |
| 32 | Select the appropriate grinding wheel | 3.30 | N |
| 33 | Mount the appropriate grinding wheel on the sleeve of the grinding machine | 3.68 | HN |
| 34 | Test the mounted grinding wheel by running it up to speed | 3.73 | HN |
| 35 | Mount the work piece to the appropriate works holding device | 2.40 | NN |
| 36 | Connect the grinding machine to an electrical supply | 3.75 | HN |
| 37 | Switch on the grinding machine for grinding operation | 3.83 | HN |
| 38 | Feed the grinding wheel on the machine on to the work piece steadily | 3.62 | HN |
| 39 | Continue applying the cutting lubrication if required | 3.68 | HN |
| 40 | Withdraw the grinding wheel and check the work piece | 3.73 | HN |
| 41 | Stop the grinding machine | 3.70 | HN |
| 42 | Remove the work piece | 3.80 | HN |
| 43 | Repeat the same procedures for other grinding operation | 3.73 | HN |
| 44 | Observe safety precautions during operation of the grinding machine for various operation | 3.80 | HN |

**3.60**

Table 2 shows that for practical skills needed in grinding machine operations, Metalwork students needed practical skills in 1 skill item with grand mean 3.30, while practical skills are highly needed in the 11 skills items with grand means ranging from 3.62 to 3.83, and practical skills Not needed in 1 skill item with grand mean 2.40. This indicates that 1 skill item needed, 11 skills items highly needed and 1 skills item not needed by the metalwork students for grinding machine operations. Therefore, metal work student need improvement on grinding machine operations.

**Hypothesis one: -**There is no significant difference between the mean responses of metalwork lecturers and students on the practical skills needed in drilling machine operations.

**Table 3:** Z-test Analysis of the Mean Ratings of the Respondents on Practical Skills Needed in Drilling Machine Operations.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Groups | N |  | SD | z-Cal. | z-Crit. | Decision |
| Lecturers | 15 | 3.77 | 0.01 | 0.60 | 1.96 | Accepted |
| Students | 30 | 3.75 | 0.02 |  |  |  |

Table 3 revealed that the value of the calculated z of 0.60 is less than the z-critical value of 1.96 at 0.05 level of significance therefore the null hypothesis (Ho1) is accepted. This implies that the group shared similar opinion on the practical skills needed in drilling machine operations.

**Hypothesis Two: -** There is no significant difference between the mean responses of metalwork lecturers and students on the practical skills needed in grinding machine operations.

**Table 4: Z-test Analysis of the Mean Ratings of the Respondents on Practical Skills Needed in Grinding Machine Operations**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Groups | N |  | SD | z-Cal. | z-Critical. | Decision |
| Lecturers | 15 | 3.52 | 0.57 | -0.74 | 1.96 | Accepted |
| Students | 30 | 3.68 | 0.03 |  |  |  |

Table 4: revealed that the value of the calculated z of -0.74 is less than the z-critical value of 1.96 at 0.05 level of significance, therefore the null hypothesis (Ho2) is accepted. This implies that the group shared similar opinion on the practical skills needed in grinding machine operations

**Findings of the Study**

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The following are the findings of the study based on the research questions answered and the hypothesis tested.

1. From Table 1, the mean responses on practical skill need of NCE (Technical) metal work students Highly needed practical skill in all 31 skills items Identified under drilling machine operation
2. From Table 2, the mean responses on practical skill needed of NCE (Technical and not needed in 1 skill item identified under Grinding machine operation.
3. From Tables 3 & 4 the group (lecturers and students) shared similar opinion on the practical skills needed in drilling and grinding machine operations.

**Discussion of the Findings**

The findings of the study are discussed based on the research questions answered and hypotheses tested. Finding relating to research question one in Table 1 showed that practical skills are needed by metalwork students in drilling machine operations and is in conformity with the NCCE (2012) minimum standard for colleges of education (technical) level where all the skill items are reflected as practical guide for training metal work students. This finding is also in agreement with Harold (1973), Sackey and Amoakohene (2007) which listed many operational practical skills that can be performed on the drilling machine.

Findings in research question two in Table 2 metalwork students needed practical skills in 11 skills items in grinding machine operations and not needed practical skills in 1 skill item. The finding of the study agrees with Ndomi (2006) who stressed that technical course teachers are required to competently train students to acquire relevant skills through the use of appropriate teaching methods and utilization of needed workshop facilities in developing the students.

Findings relating to hypothesis one indicates the value of calculated z of 0.60 less than z-critical of 1.96 which implies that there is no significant difference between the mean responses of the students and lecturerson practical skills needed in drilling machine operations. The result of the finding supports the position of Idi (1998), that to have appropriate skills is to improve on the joband to remain on the job.

The null hypothesis two is accepted, which implies that there is no significant difference between the mean responses of students and lecturers on practical skills needed in grinding machine operations. The result of the findings supports the position of Ndomi (2006) that technical course required competently trained students to acquire relevant skills through the use of appropriate teaching methods and utilization of needed workshop facilities in developing the student.

**Conclusion**

Based on the results of this study it can be concluded that metal work students need more practical skill training in machine shop operations i.e drilling machine operations and grinding machine operations.

**Recommendations**

1. All the skill items rated as needed identified in the study should be taught adequately to metal work student to prepare them skillfully prior to their graduation.
2. Metal work lecturers should give more attention on areas of difficulties, especially during machine tool sitting, work setting, operational procedures and safety precautions so as to engage metal work students with practical skills on machine shop practices i.e Drilling machine, Grinding machine.

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**STRATEGIES FOR IMPROVING QUALITIES OF BUSINESS EDUCATION GRADUATES FOR NATIOANAL DEVELOPMENT**

**BY**

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**Abstract**

*This study investigated the strategies for improving qualities of business education graduates for National Development. The population for the study comprised 120 lecturers and postgraduate students in Department of Business Education, University of Nigeria, Nsukka. The population consists of all the 15 lecturers and randomly selected 105 postgraduate students in the Department. Four research questions guided the study. The study adopted descriptive survey design. The instrument used for data collection was structured questionnaire designed by the researchers. The questionnaire was validated by 3 experts, while the internal consistency of the questionnaire items was ascertained through Cronbach Alpha technique which yielded a reliability coefficient of 0.86. The questionnaire was administered personally by the researchers. A total of 120 copies of the questionnaire were administered, retrieved and analyzed for the study. The study found that human relations, innovative, problem-solving and spreadsheet were qualities or skills the business education graduates are expected to possess. It also found that proper selection of students during admission, exposing students to entrepreneurship education and engaging students in work-based learning were strategies for improving the qualities of business education graduates. The researchers recommended that the lecturers should engage students in work-based learning and expose students to entrepreneurship education. The researchers also recommended that Government and Non Governmental Organizations (NGOS) should assist in providing modern infrastructural facilities for effective teaching of students, which will improve the qualities of graduates.*

**Key words:** Qualities, Business Education Graduates, National Development

**Introduction**

Business education is defined differently according to the perception of authors. Some defined business education based on the learner, some on the business while others on the world of work. For instance Osuala (2004) defined business education as a programme of instruction to provide students with information and competencies which are needed by all in managing personal business affairs and in using the using the services of the business world. Business education is an aspect of vocational education which prepares the learner for accounting, distributive education, general business and office occupations. Business education, according Amaewhule (2000), is an aspect of education which inculcate in the learners knowledge, attitudes and skills needed by all citizens in order to effectively manage their personal businesses. Amoor (2010) sees business education as a vocational education programme which equips the learner to become productive in teaching, paid employment and self employment. Atakpa (2011) describes business education as an embodiment of vocational knowledge and skills needed for employment and advancement in a business. Business education is a field of study which prepares people about business. It is a preparation for a career in business when instruction is designed to prepare and produce quality graduates with written skills, accounting knowledge, personal characteristics, business knowledge, word processing package and self-management.

Quality is a standard of something as measured against other things of a similar kind. Quality, according to Business Dictionary (2018), is strict and consistent commitment to certain standards to achieve uniformity of product in order to satisfy specific or user requirements. It is the totality of features and characteristics of a product or service that bears its ability to satisfy stated or implied needs. Article II of the World Declaration on Education (2003) stated that quality is a multidimensional concept which should encompass all the functions and activities in graduates. The quality of business education graduates, according to Urah (2005) is measured by how well they have been prepared for life and for service to society in various areas of human endeavour. Quality of graduates could also be measured by how prepared the graduates are for meeting the challenges of life and for solving the societal problems. Graduates of business education are well prepared when they have acquired knowledge and skills which qualifies them for paid employment, self-employment and self-reliance.

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Cranmer (2006) has expressed concern that universities do not realistically guarantee producing quality graduates required by employers. More specifically, Cranmer (2006) doubts the ability of business education to successfully develop the required skills that will produce appropriate quality graduates. The author felt that the institutions may not put in place quality enhancing strategies that will ensure the production of quality graduates for national development. Such quality enhancing strategies include adequate funding, effective monitoring and evaluation, review of programme, recruitment of quality staff, use of quality course materials, effective assessment and development of staff as well as standardization of requirements for intake of quality students. Clanchy and Balland (1995) stated that the institutions of higher learning may only give an assurance that learners will have the chance to acquire the skills during undergraduate education. This could only be possible when the learners are taught and acquire the expected qualities or skills before they graduate. Such expected qualities or skills, according to Albrecht (2002), include critical and analytical thinking, technology, spreadsheet package, accounting package and data base package. Others, according to Okoli (2013), are interpersonal skills, communication, and management skills, decision-making. Okoli opined that the skills needed are human relations, innovative and problem solving skills. Skills, according to Okoli (2013), are practical activities which make one employable, self-reliant and relevant to the society. Skill is ability to do something well, and it is usually gained through training or experience. Chibuike (2013) suggested that strategies to improve qualities or skills of graduates include making available adequate facilities, employing qualified business educators and proper selection of students during admission. Robertson and Attanassiou (2009) opined that the integration of business ethics courses in business education curriculum, training and retraining of business educators will improve the qualities of business education graduates. The authors suggested that work-based learning and entreprenurship education are also strategies for improving qualities of business education graduates.

Work-based learning, as stated by Urquiola, Stern, Horn, Dornsife, Chi, Williams, Merritt, Hughes and Baileg (1997), is teaching students based on knowledge or skill related to employment. The primary purposes for work-based learning according to the authors, include: acquiring knowledge or skill related to employment in particular occupations or industries; providing career exploration and planning; learning all aspects of an industry and increasing personal and social competence related to work in general through entrepreneurship education.

Entrepreneurship education is planned programme of instruction aimed at equipping students with entrepreneurial skills and competencies to enable them start and effectively manage their business enterprises. Entrepreneurship education, according Osuala (2004), is a programme that prepares individuals to undertake the formation and operation of a small business. It helps graduates to create employment opportunities for themselves and others by investing their knowledge, skills and other resources to satisfy the needs in an environment. Entrepreneurs or business operators scout for and discover business opportunities as well as plan promotional activities to increase patronage. Graduates of business education who possess the expected skills such as human relations, innovation and problem solving skills among others can run any kind of business enterprise.

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A graduate who possesses human relation skills, according to Olaniyi (2016), will succeed in entrepreneurial business. Entrepreneur is a human factor that organizes other factors of production such as land, capital and labour to achieve set business goals. Uche (2000), in similar view, stated that no matter how hard working or brilliant an individual may be, his professional life will suffer if he cannot relate with other people. This implies that human relation entails the ability to interact, collaborate and live well with co-workers, accept criticisms, innovative advice and suggestions from others that help to increase customers’ satisfaction. Innovation, according to Hennessey and Amabile (2010), is the successful implementation of creative ideas within an organization. Therefore, innovative skills for entrepreneurial development include introduction of new products, new methods of production, opening new markets and exploring new sources of supply of raw materials (Oduma 2011). Business education graduates who acquire these skills will function effectively in the contemporary competitive environment and strong market forces that will enable them turn business problems into business opportunities. A business is built on the problems (needs and wants) of customers and without these there will be no business. This is why problem-solving skills are necessary tools for the operation of an enterprise. Problem-solving skills for entrepreneurial development include critical thinking, understanding of the business, team spirit, decision-making and courage. The acquisition of these skills will enable graduates of business education identify business problems and become critical thinkers so as to turn business problems into opportunities.

The prevailing unemployment which has become a general national problem creates need for individuals and national entrepreneurship development to increase citizen’s standard of living. This is because business education graduates or entrepreneurs according to Drucker (2005), are energizers, risk takers, job providers, innovators and instrument for national development.

Development is gradual advancement or growth through a series of progressive changes. National development is measured using a range of economic indicators such as gross domestic product, gross national product and purchasing power parity. Development cannot take place in itself but requires an educated, skilled and competent people. Graduates of business education holds the prospect of contributing through its paid employment, job creation and self-employment packages for the attainment of national development. The gainful employed graduates would be useful for themselves because they could sustain themselves and other dependent relatives. They would also be useful to the nation by contributing to gross domestic product thereby reducing poverty, unemployment and increasing per capita income which contributes to national economic growth.

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However, Amoor (2008) noted that graduates of business education are inadequately exposed to modern office technologies, rudiments of office administration and other necessary skills. Hodges and Burchel (2003) explored employers’ views of about how well business education graduates are prepared for the workplace, and established that employers look for graduates’ software skills, and their ability to deal empathetically and effectively with job demand. The authors stressed that employers believe that graduates have unrealistic expectations about business world and lack interpersonal skills. It is expected that business education graduates would possess relevant qualities or skills and entrepreneurial skills that will enable them become successful entrepreneurs. Unfortunately, most of these graduates seem to lack the expected qualities or skills, interest and confidence in entrepreneurial activities for self-reliance. They, rather join in the search for scarce job opportunities thereby increasing the unemployment number. The endless search for job opportunities by these graduates shows that they do not possess the expected qualities or skills required by the labour market. Consequently, many of them could not be either engaged in paid employment or self-employment as entrepreneurs.Some of them, because they could not be employed began to engage in immoral and depraved activities. Therefore, there is need to improve the qualities or skills of business education graduates.

The major purpose of this study therefore was to investigate strategies for improving qualities of business education graduates for national development.

Specifically, the study sought to:

1. Identify the qualities expected of business education graduates.
2. Ascertain the challenges to attainment of the qualities expected of business education graduates.
3. Ascertain the strategies for improving the qualities of business education graduates

**Research questions**

The following research questions guided the study:

1. What are the qualities expected of business education graduates to possess?
2. What are the challenges in attaining the qualities of business education graduates?
3. What are the strategies for improving the qualities of business education graduates?

**Methodology**

**Design of the study**

The study adopted descriptive survey design to identify the qualities expected of business education graduates; ascertain the challenges to attainment of the qualities by business education graduates and ascertain the strategies for improving the qualities of business education graduates. The study was conducted in University of Nigeria, Nsukka and Department of Business Education was chosen. Department of Business Education was chosen because the Department has the largest enrolment of postgraduate students in the Universities in the South East Nigeria (NUC, 2017 Record).

**Population for the study**

The population for the study was 120, made up of 15 lecturers and 105 randomly selected postgraduate students in the Department of Business Education, University of Nigeria, Nsukka.

**Instrument for data collection**

The instrument used for data collection for the study was structured questionnaire. The structured questionnaire titled ‘Strategies for Improving Qualities of Business Education Graduates (SIQBEG’) – was developed by the researchers from literature. The instrument was divided into Part I and Part II. Part I was on general information about the respondents. Part II was further divided into sections A, B and C. Section A had 6-item statement that sought information on the qualities expected of business education graduates. Section B had 5-item statement that sought information on the challenges for the attainment of qualities by business education graduates while Section C contained 6-item statement that sought information on the strategies for improving the qualities of business education graduates. The response categories for the two sections was a 4-point rating scale which ranges from 4 – 1 (Strongly agree = 4; Agree = 3; Disagree = 2 and strongly disagree = 1).

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The questionnaire was validated by three lecturers from Faculty of Vocational and Technical Education, University of Nigeria, Nsukka; while the internal consistency of the questionnaire items was ascertained through Cronbach Alpha technique which yielded a reliability coefficient of 0.86.

**Method of data collection**

The questionnaire was administered to the respondents by the researchers. The researchers took time to explain to the respondents areas and terms they find difficult to understand to ensure their objective responses to the questionnaire items. One hundred and twenty copies were administered and one hundred and twenty copies were retrieved showing 100% return rate.

**Method of data analysis**

The two research questions were analyzed using mean and standard deviation. Mean scores of 2.50 and above were regarded as agreed while mean scores below 2.50 were regarded as not disagreed.

**Table 1: Mean responses of respondents on the qualities expected of business education graduates**

**N = 120**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/no | Item Statement | Lecturers  X SD | Graduates  X SD | Overall  X SD |
| 1 | Interpersonal skills | 2.7 .98 | 3.2 .58 | 3.0 .78 |
| 2 | Critical and analytical thinking | 3.4 .63 | 3.1 .60 | 3.3 .62 |
| 3 | Human relation skills | 3.1 .60 | 3.0 .59 | 3.1 .60 |
| 4 | Innovative skills | 3.6 .54 | 3.4 .81 | 3.5 .68 |
| 5 | Problem-solving skills | 3.7 .53 | 3.1 .65 | 3.4 .78 |
| 6 | Spreadsheet  Grand mean/std | 3.0 .74 | 3.3 .59 | 3.2 .67  3.2 .64 |

The grand mean score of all the items in Table 1 was 3.2 and was within the boundary limit of 2.50 – 4.00. This implied that the item statements were qualities or skills expected business education graduates to possess. The grand standard deviation of items 1 – 6 in table 1 was .64. This implies that the opinions of respondents were close to each other.

**Table 2:** Mean responses of respondents on the challenges to the attainment of qualities by business education graduates

**N = 120**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/n | Item Statement | Lecturers  X SD | Graduates  X SD | Overall  X SD |
| 1 | Poor state of Nigeria economy | 3.1 .61 | 3.3 .60 | 3.2 .61 |
| 2 | Weak internal capacity (over stressing available facilities) | 3.2 .60 | 3.5 .60 | 3.4 .60 |
| 3 | Inadequate facilities | 3.1 .60 | 3.3 .71 | 3.2 .66 |
| 4 | Lack of link between industry and institution | 3.3 .59 | 3.2 .67 | 3.3 .63 |
| 5 | Corruption in educational sector  Grand mean/std | 3.5 .67 | 3.3 .66 | 3.4 .70  3.3 .64 |

In Table 2, the grand mean score was 3.3 and this implied that the respondents agreed that the six item statements were the challenges to the attainment of qualities expected business education graduates to possess. The grand standard deviation is 64 and it implied that the range in the responses of respondents was not far from the mean.

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**Table 3:** Mean responses of respondents on the strategies for improving the qualities of business education graduates

**N = 120**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/no | Item Statement | Lecturers  X SD | Graduates  X SD | Overall  X SD |
| 1 | Proper selection of students during admission | 3.8 .48 | 3.5 .51 | 3.7 .50 |
| 2 | Exposing students to entrepreneurship education from first year | 3.7 .50 | 3.4 .60 | 3.6 .55 |
| 3 | Employing qualified business educators | 3.0 .58 | 3.5 .49 | 3.3 .54 |
| 4 | Integration of business ethics courses in curriculum | 3.6 .52 | 3.1 .60 | 3.5 .56 |
| 5 | Training and retraining of business educators | 3.7 .51 | 3.0 .80 | 3.4 .67 |
| 6 | Engaging students in work-based learning  Grand mean/std | 3.4 .60 | 3.6 .57 | 3.5 .59  3.5 .60 |

In Table 3, the grand mean score was 3.5 and this implied that the respondents agreed that the six item statements were strategies for improving the qualities of business education graduates. The grand standard deviation is .60 and it implied that the opinions of the respondents were close to each other.

**Discussion of the findings**

The study revealed that the grand mean score of 3.2 is an indication that interpersonal skills, critical and analytical thinking, human relation, innovative, problem-solving and spreadsheet were qualities or skills expected business education graduates to possess. This is in line with the opinion of Okoli (2013) that business education graduates should possess skills in human relation, innovative and problem-solving.

This study also revealed that lack of link between industry and institution, corruption in education sector, weak internal capacity and poor state of Nigeria economy as challenges to attainment of expected qualities business education graduates should possess. This is consistent with Ijeoma and Osagie (2005) who identified poor state of economy, weak internal capacity, inadequate facilities and lack of link between industry and institution as challenges to attainment to expected qualities business education graduates should possess.

The study revealed that proper selection of students during admission, exposing students to entrepreneurship education, employing qualified business educators, engaging students in work-based learning were strategies for improving the qualities of business education graduates. This is in line with the view of Robertson and Athanassiou (2009) who suggested similar strategies for improving the qualities of business education graduates.

**Conclusion**

The paper sought to investigate strategies for improving qualities of business education graduates using survey research. The conclusion from this survey provides empirical and relevant input for practical teaching and participation in teaching business education courses. Graduates entering the workforce are expected to be trained more in interpersonal, critical and analytical thinking, human relation, innovative, problem-solving and spreadsheet skills. The way to address the skills or qualities deficiencies would require business educators or lecturers to engage students in work-based learning and expose students to entrepreneurship education. The business education students on the other hand need to learn more about information technologies and server management.

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**Recommendations**

Based on the findings of this study, the following recommendations were made:

1. Business educators should be encouraged and motivated by their employers in order to be more productive in their work.
2. Business studies curriculum in junior secondary school which form basis for business education in higher institutions should be made compulsory in Junior Secondary School (JSS).
3. Government and Non Governmental Organizations (NGOS) should assist in providing modern infrastructural facilities to institutions offering business education.
4. Institutions should liaise with industries around to form a kind of partnership to ease the impartation of these skills. That is, having school – industry partnership because some of these equipment/facilities are not in institutions
5. The coordinator of Students Industrial Works Experience Scheme (SIWES) should ensure that students are trained in related industries to their fields of study. The coordinator should also ensure that students are adequately supervised by both the school-based and industry-based supervisors.
6. The teaching and learning of computer in business education should be re-emphasized and the computer laboratories be adequately equipped to help students acquire the needed skills on graduation.

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**INDUSTRIAL ATTACHMENT FOR TECHNICAL AND VOCATIONAL EDUCATION LECTURERS: AN IMPERATIVE FOR EFFECTIVE DELIVERY**

**BY**

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**Abstract**

*World over, education stakeholders agree that the industry is the most reliable learning environment to train a competent workforce. The industry provides a context for lecturers and students to transform and construct vocationally, socially and meaningful knowledge and skills. Training providers and industries, through employers, form partnerships to offer situated learning opportunities in the industry so that lecturers and students have access to reliable experiences that only the industry can offer it.Industrial attachments have long been accepted as a core component of training for trainees and are well structured and coordinated. Industrial attachment is also equally important for lecturers and instructors;yet it has not received parallel attention, coherence or coordination at the policy or organisational levels. Thepaperstarts with an overview of training arrangements for Technical Vocational Education and Training (TVET) lecturers followed by literatures on the importance of industrial attachment. The paper also takes a look on changing role of TVET lecturers****,*** *challenges for implementing Industrial Attachment for TVET Lecturers. It wasrecommended that industrial attachment should make an integral part of TVET curriculum by making it one of the promotion requirements for the affected lectures.*

**Key words:** Industrial Attachment, TVET, education stakeholders.

**Introduction**

Technical and Vocational Education and Training programme TVET need a solid background upon which the needed skills training are laid. Training programmeon TVET must be based on “demand driven” not based on job placement([Megan Murray, 2008](#_ENREF_17)). [Megan Murray (2008)](#_ENREF_17), further affirmed that, in order to be effective, TVET programmes must produce potential workers as apublic good that benefits firms in order to encourage outside investment.The effectiveness of the training received from our institutions has been criticized on their inability to eradicate poverty and create employment among the students.There is need for a new shift for TVET programmes thatcan link specific skills training to industry. In order to improve the economy and thelives of our students and the nation in general, TVET must berigorous, *effective,efficient, competitive and flexible*and *responsive,* so that the trainees will get the meaningful and quality skills required to gain employed or be self-reliance.

Industrial attachments usually refer to the formal placement of students in the industry to facilitate the achievement of specific learning outcomes that would potentially lead to their employability on completion of a training programme([Megan Murray, 2008](#_ENREF_17)). Industrial attachments typically involve training providers and industries (through employers) forming partnerships to offer situated learning opportunities in the industry so that students and TVET lecturers have access to authentic experiences that only the industry can offer. Nowadays, older and experienced workers are also participating for re-training, lifelong learning, and personal development.

According to [McLean (2006)](#_ENREF_16),Industrial attachment is not only critical for students, it is equally important to lecturers, mentors and instructors (who are referred to as ‘TVET practitioners’ in this paper). The term ‘industrial attachment’ is commonly used in Asian and African TVET systems to describe arrangements allowing TVET practitioners to replenish and update their skills in industries. In other countries it is called on-the-job learning for teachers and trainers (e.g. Finland), return or back to industry programs (e.g. Australia) and industry placements or secondments (e.g. United Kingdom).

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As TVET lecturers are “involved in a range of ‘direct’ activities, such as delivery, development, and review and assessment of courses or modules so also be partaking in doing the IT "([NCVER, 2004](#_ENREF_18)). The delivery of courses or modules, in the TVET institutions, remains the most common activity for TVET lecturers. However, among industry circles, subject specialists with trade competencies, rather than those with additional pedagogical skills are still regarded as effective trainers. [Gauld and Miller (2004)](#_ENREF_11), found that many employers continue to engage subject specialists for the provision of training in the industry. Many employers are sending the message that anyone can be anindustry instructor or training specialist once they have some knowledge in a particular content area. However, there are important pedagogic practices as well as content that are required for effective learning in industry and elsewhere (i.e. TVET colleges).

There is no doubt about the authenticity of the industry asa learning environment. Many authors([Hager, 2004](#_ENREF_12));[Clayton, Fisher, and Hughes (2005)](#_ENREF_6);[Deissinger and Hellwig ( 2005)](#_ENREF_8); [Harris and Simons (1999)](#_ENREF_14); [Billett (1992)](#_ENREF_3), maintained that the industry provides the most authentic learning environment to train a competent workforce. The industry also remains the main site for enculturation and the inculcation of trade values ([Choy & Haukka, 2009](#_ENREF_5); [Harris & Simons, 1999](#_ENREF_14)).

[Young and Guile (1997 )](#_ENREF_23)beliefs that, TVET lecturers can also gain from industry learning which remain the key ‘connective specialists’, through linking the educational institutions with the industry. Industrial attachment is seen as an effective professional development activity for TVET lecturers to maintain and updatesof their vocational knowledge and expertise including their knowledge of technologies and practices commonly used in contemporary industries([Loveder, 2005](#_ENREF_15)). This ongoing development is necessary because the role of TVET lecturers is constantly changing.

**Changing Role of TVET Lecturers**

According to many authors in TVET research [Clayton et al. (2005)](#_ENREF_6); ([Harris & Simons, 2005](#_ENREF_13)); [Attwell (1999)](#_ENREF_1) agreed that, TVET lecturers’roles are changing continuously. Among the many work rolesof TVET lecturers comprises spending most of their time working in industry, mainlycheckingthe progress of student in industry.. Forthe purpose of effectiveteaching and learning within their working environment,there is need for the TVET lecturers to be well informed and up to date with internal and external changes in industry, as well as changing needs of the labour market. The lecturers will be assisted by the acquired knowledge in preparing the students for contemporary industries as well as for future employment or entrepreneurship. [Attwell (1999)](#_ENREF_1), enumerated three main sources of change that impacted on TVET lecturers:

1. reforms in TVET policy and practice;
2. developments in TVET pedagogy; and
3. changes in industry.

Those changes in industry are continuous, but very quick in some areas and slower in other areas. Precisely, in our contemporary knowledge-era in which the industry encompasses equipment and machines that are computerised, more complex and sophisticated that make them be more complex and ill-structured ([Tan, Chye, & Teo, 2009](#_ENREF_20); [Zhou, 2012](#_ENREF_24)). As such, students with only hard skills (technical) without the soft skills may not survive under that type of workstation ([Bakar & Hanafi, 2007](#_ENREF_2)). The quicker and less formal way to maintain innovation of industry changes is for TVET lecturers to participate in industrial attachment and directly access industries or learn through other agents such as professional bodies, guilds and networks.

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From the given reasons above we could understand that, industrial attachment is very importantif we want to maintain the competencies for TVET lecturers. Competencies such as:

1. Knowledge and understanding of changing working life and society;
2. Occupational subject matter expertise and the ability to apply occupational knowledge in different contexts;
3. Pedagogical expertise and the ability to apply it in planning, implementing and evaluating different pedagogical and curriculum strategies; and
4. Self-reflection and research into own activities, student activities, changing working life and society, occupational subject knowledge and new pedagogical and curricular strategies for self-development and the development of the management of learning([Attwell, 1999](#_ENREF_1)).

Arrangements for industrial attachments must form part of an overall professional development strategy for TVET lecturers in an ever changing industry environment of today. Doing so,TVET lecturers will be equipped with the needed industry skills and competencies for the future use.The following are the needed range of skills and competencies for the TVET lecturers. These include:

1. an ability to adapt to change and cope with uncertainty;
2. client-focus skills;
3. management and leadership capabilities;
4. coaching, mentoring and networking skills;
5. information and communication technologies (ITCs);
6. knowledge work capabilities i.e. the ability to access, create and use knowledge to add value to their business;
7. pedagogical expertise, learner focus and industry currency knowledge and skills
8. continually upgrading their skills and knowledge;
9. self-managing their own careers and development as they move across Registered Training Organisations (RTOs) and within industry;
10. accommodating identity shifts as they move across roles and organisations;
11. learning to work in teams, across organisations and within networks; and
12. being prepared for more fragmented and specialised roles, such as assessment([Dickie, Eccles, Fitzgerald, & McDonald, 2004](#_ENREF_9)).

However, to fulfil their role in linking the training provided in the institutions to the needs of industry, TVET lecturers must maintain expertise in TVET pedagogy as well as industry competence and industry developments. [Attwell (1999)](#_ENREF_1), said in terms of organisational change, TVET lecturers as the leaders of change and progress,it is necessary to have a greater opening up to the world of work”. He further recommends the change to be through active teaching and learning (Problem-based learning) connecting the lessons to industry experiences. Attwell goes on to claim that there is no way lecturers can create situational learning experiences without an understanding of industry contexts and changes. And that experience can only be gained through regular industrial attachment by the lecturers.

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Lecturers in TVET can no longer continue delivering quality training using the acquired knowledge and skills from their initial university training, specificallywithout updating their knowledge and skills through industry training. Although, the roles of TVET lecturershave changed, requiring that their knowledge and skills should be regularly updatein line with industry changes, their training and follow-up staff development for that matter, remains deficient in Nigeria.

**Training of TVET Lecturers**

The literature on training for TVET lecturers relate mainly to their initial training. There is little detail about industrial attachment for initial training or for updating. In most European countries for example, industrial knowledge, skills or competencies form a pre-requisite of TVET teacher training([Nielsen, 2002](#_ENREF_19)). For instance in Germany the dual TVET system training is aided by industry instructors ([Deissinger & Hellwig, 2005](#_ENREF_8)). Teachers with a university degree and at least one year of practical experience provide the off-the-job component to students. These teachers teach the more generic components and are not required to maintain industry skills. This situation may fail to appreciate the importance of knowing how to apply generic knowledge in workplace settings.

Training and skilling of TVET lecturers has been principallythe domain of the TVET or university institutions. “It needs to ensure that lecturers and instructors are well equipped in their technical areas of expertise; that they have a solid foundation in facilitating learning in a wide range of settings and that they have opportunities to develop personally and professionally”. Research by [Attwell (1999)](#_ENREF_1) shows that there is no constant approach to training TVET professionals. According to [Nielsen (2002)](#_ENREF_19) review, most countries in Europe are working towards a standardised qualification for TVET practitioners.

Technical Vocational Education and Training in most regions of the world is founded on partnerships between the government, industry and TVET providers. Industries, through employers, are now more active in the development of the workforce and enhancing the social and economic capital. They contribute to the establishment of standards and industry competencies and provide situated learning and training opportunities for trainees. While industry support and committed to the development of employable workers is widely evident, similar arrangements and commitments for on-going training and skilling of TVET practitioners to maintain industry innovations appears lower on the agenda of the key partners. Perhaps the value of maintaining innovations and its impact on the quality of TVET is not fully appreciated at the policy level in many African countries. The absence of any strategic policy or regulatory requirements for innovations of industry knowledge and experience for TVET lecturers leaves no particular authorities or partners taking responsibility or leading the way.

As connective specialists, and a conduit between TVET institutions and industries, TVET lecturers need more formalised arrangements to continue their learning and skilling to ensure that industry and competency standards are up-to-date. Technical Vocational Education and Training employers, industries, the TVET or university providers and the practitioners themselves remain the key partners who can make a change. Deeper understanding and appreciation of the significance of industrial attachment for TVET lecturers would stimulate debates and provide greater prominence, thereby gain genuine support and commitment from all stakeholders.

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**Importance of Industrial Attachment for TVET Practitioners**

Many literaturesarein supports ofthe effectiveness of industrial attachment to the qualifications and experience of the TVET lectures/instructor[Birkenholz (1999)](#_ENREF_4);[Thompson(2001)](#_ENREF_21);[Walter(2002)](#_ENREF_22).Efficiency and knowledge of TVET lecturers could only be improve through return to industry for updates([Gauld & Miller, 2004](#_ENREF_11)).That was the opinions of thirty-one percent (31%) of 303 lecturers/instructors having ten years and above working experience.Literature shows that there are five possible key evidences that support the importance of industrial attachments for TVET lecturers:

In Australia industrial updates is considered as one of seven collections of capabilities and skills essential for effective TVET lecturers([Dickie et al., 2004](#_ENREF_9)).Those industrials updates will help the lecturers to be at equilibrium between delivery of technical and industry specific skills with generic employability skills. Likewise, updates of vocational skills and knowledge from industry were regarded as one of the five key capabilities needed by TVET lecturers that can be integrate into their own teaching programmes to ensure students graduates with immediate useful skills as required by the employers ([Cort, Harkonen, & Volmari, 2004](#_ENREF_7)). As such, it is necessary for the TVET lecturers to be industrially updated.Understanding of the precise indicators of vocational knowledge is needed. Industry learning is procedural or instrumental in nature, while theoretical and conceptual aspects that explain the ‘why’ form the content of learning in TVET institutions. It is often assumed that students will be able to adequately contextualise, integrate and apply their knowledge and skills, gained in educational institution. Technical Vocational Education and Traininglecturers play a critical role as ‘connective specialists’ to contextualise the theory into practice ([Young & Guile, 1997](#_ENREF_23) ). Updating TVET lecturers’ knowledge from industry will make them understand its authentic application for the benefit of their students.

As the world is becoming a global village so also with the world of work changes, it become essential to understand how those changes can be integrated in teaching and learning. [Young and Guile (1997 )](#_ENREF_23), said that workers of the day must possess higher levels of conceptual understanding combinewith “occupational and organisational capability” so that they be able to work with different occupational groups. To them it means regular attending industrialattachment is not just to update their knowledge and skills, but also to learn how to apply occupational knowledge in different and changing work contexts. Therefore, TVET lecturers and their students develop what ([Engestrom, 1995](#_ENREF_10))refers to as poly-contextual skills, “the ability to move confidently between groups with different kinds of expertise”. According to [Young and Guile (1997)](#_ENREF_23),to develop those skills,lecturers’ work needs a shift to include more collaborative approaches to apprenticeship training such as facilitating ‘learning conversations’ among students, apprentices and employees on different sites and with different experiences through, for example, communities of practice. In this way, the imperative to maintain skills innovations in the face of transforming industry requirements stands as an important rationale for industrial attachments.

Credibility of TVET lecturers is equally important. Maintaining industry updates is vital to TVET lecturersthat are usually criticised due lack of up-to-date and relevant experience and knowledge, particularly in relation to technological advances and ways of working in modern industries([Loveder, 2005](#_ENREF_15)). Lecturers in TVET must learn about new and emerging developments, changing work cultures and competency requirements in their industry areas so that they are better equipped to train their students. Research conducted by ([Gauld & Miller, 2004](#_ENREF_11)) revealed that an excellent knowledge of the subject alone cannot be adequate for lecturers and instructors. As such TVET lecturers are needed to improve job competence (carrying out complete roles in the industry), as well as task competence (practical tasks). Industrial attachment provides connections for lecturers as well as the students between educational institutions and industries. Lecturers should maintain a close contact with industriesemploying graduates in future, through training between them and industry instructors ([Cort et al., 2004](#_ENREF_7)). They further beliefs that, lecturers’ motivation and experiences stimulationcould only be achieved through work placements in industry. Skills and knowledge of lecturersin their areas of specialization could also be improved through industrial attachment leading them use new teaching methods and materials, “giving them a realistic and holistic impression of the professions, and bringing elements of realism into their teaching”.

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**Challenges for Implementing Industrial Attachment for TVET Lecturers**

The industries must be fully committed and be ready to offerassistance, as and when required, to realize the spirit of the programme.Building and sustaining a productive education-industry partnership requirescommitment, time, effort and involvement.However, the likely challenges that may affect partnership between TVET institutions and industries include:

**Table 1: Possible challenges to maintaining education-industry partnership**

|  |  |  |
| --- | --- | --- |
| S/N | Possible barriers | Aspects |
| 1 | Resource | * Lack of time and money * Teaching workload * Pace of change * Teacher release and replacement for professionaldevelopment |
| 2 | Disposition | * Lack of confidence * Fear of returning to an industry that may not be familiar to them anymore * Resistance to change * Lack of motivation * Failure of teachers to recognise their own skills deficits |
| 3 | Practical | * Difficulty of accessing industries that were willing to have teachers learns to use new technology and expensive machinery. * Accessing industries which were up to industry standard or that were engaged in training using training packages. * Lack of businesses across the various industries in regional areas * Organisational impediments such as the poor management and educational leadership, devaluating of the importance of technical skills, and a lack of incentives, regulation or policy within institutions. * Environmental impediments such as difficulty accessing training due to geographical isolation, rapid and frequent technological change, and a changing and ageing demographic. |

Source: ([Clayton et al., 2005](#_ENREF_6))

**Conclusion**

It is challenging to reproduce the demand of industries in schools and colleges. Some institutions employ staff who can communicate more effectively than others the kind of disciplines and expectations of the industry. However, structured learning in the industry remains the most effective context in which to acquire the skills and behaviours required in work for both the lecturers and also the students and it is this which forms a core of high quality training in TVET.

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**Recommendations**

From ongoing discussion, one can see that updated experiences of industry changes, knowledge and skills of lecturers could have significant positive implications for the quality of TVET delivery. Industry attachment for lecturers and instructors to updates and maintain innovations needs to be an integral element of quality provision of TVET. Therefore,

1. Ministries of education at the federal and state levels should get ready to implement the programme and make it one of the promotion requirements for lectures.
2. The lecturers on the training programme should be on full payment together with additional allowances to make it more effective and attractive.
3. There should be adequate supervision and monitoring from their schools and the affected commission (i.e. National commission for colleges of education (NCCE), National Board for Technical Education (NBTE), and National University Commission (NUC).

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**AN ASSESSMENT OF SECONDARY SCHOOLS TEACHERS’ USES OF ICT’S IN BORNO STATE, NIGERIA**

**BY**

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**Abstract**

*The use of ICTs in Nigeria and African countries generally is increasing. However, while there is a great deal of knowledge about how ICTs are being used in developed countries, there is not much information on how ICTs are being used by teachers in developing countries. This study examined Nigeria secondary school teachers’ uses of ICTs and its implications for further development of ICTs use in Nigerian secondary schools. The sample of the study comprised of 435 teachers from thirteen randomly selected secondary schools in Biu Education Zone, Borno state, Nigeria. This comprised 294 males and 141 females. Their ageranged from 25 – 45 years with a mean age of 35 years. A modified instrument tagged Teachers ICT use survey adapted from ICT survey indicator for teachers and staff by UNESCO (2004) and ICT Teachers Survey by New Zealand Ministry of Education MINEDU (1999) were used for the collection of data. The results showed that teachers generally have access to ICTs in their various schools except e-mail and Internet because their schools are not connected. Technical support are lacking in the schools and teachers lack of expertise in using ICT was indicated as being the prominent factors hindering teachers readiness and confidence in using ICTs during lesson. Furthermore, the results show that teachers perceived ICT as being easier and very useful in teaching and learning.It was recommended among others that teacher training and professional development oriented policies should support ICT-related teaching models that encourage both students and teachers to play an active role in teaching/learning activities.*

**Keywords**: Information communication technologies, Teachers, Teaching and Learning, Secondary schools, Borno State, Nigeria.

**Introduction**

Africa have witness the development of ICTs in various sectors over the last decade including education. The change from teacher-centered education system to learner centred education all over the world in the past few years contributes to the use of ICTs in education. In order to achieve a “knowledge –driven world” as conceived by (Hawkins, 2004; Inwent, 2004), it means that education reform practices should focus on equal access and quality of education which should highlight the importance of change in the education sector through the use of ICTs and equipping new generations with enhanced skills to operate in the 21st century. The use of ICTs in Nigeria and African countries generally is increasing and dramatically growing. However, while there is a great deal of knowledge about how ICTs are being used in developed countries, there is not much information on how ICTs are being introduced into schools in developing countries (Beukes-Amiss and Chiware, 2006; Buabeng-Andoh, 2012; Sife, Lwoga, and Sanga,2017). NESCO (2004) as cited by Al-Natour, et al. (2018), defined ICT as those aspects of scientific, technological and engineering knowledge, and administrative methods that are used to access and process information and its applications – the interaction between computers and tools with human beings and their social, economic and cultural matters.It should be noted that availability of ICTs vis-à-vis access in term of ratio of teachers and students differs significantly. Despite this, the new and emerging technologies challenges the traditional process of teaching and learning, and the way education is managed. While information communication technology is an important area of study in its own right, it is having a major impact across all curriculum areas.

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Easy worldwide communication provides instant access to vast array of data, challenging assimilation and assessment skills (Fowowe, 2006). Rapid communication plus increased access to ICTs in the home, at work, and in educational establishment, could mean that learning becomes a truly lifelong activity- an activity in which the pace of technological change forces constant evaluation of teaching process itself. It functions does not end there. The current issue is the use of ICTs in the classroom by the teachers. This includes specifically the use of computers, Internet, telephone, digital camera, dataprojector, etc. As the world continues to revolve around technology, teachers need to continue incorporatingthese new technologies into their teaching.

Meanwhile, it is observed that some studies have been conducted on uses of ICTs by teachers particularly on theissue of their professional development. Most of these studies were carried out in developed countries where theuse of ICTs has come of age, and where there are resources and material to maintain them. However, the use of ICTs by teachers in Nigeria is just beginning to gain popularity and researches in the area have just startedemerging. Emphatically, the use of ICTs by teachers to teach the students is highly advantageous. This isbecause its enable them to demonstrate understanding of the opportunities and implications of the uses forlearning and teaching in the curriculum context; plan, implement, and manage learning and teaching in open andflexible learning environment (UNESCO, 2004; Osakwe, 2018). In the light of these therefore, more research is needed toshowcase further development of ICTs use by secondary school teachers in Nigeria. Hence there is the need to assess secondary school teachers Uses of ICT’s in Borno State, Nigeria.

**Statement of the Problem**

Despite the strength of the rapid spread of technology around the world in recent time, there is a decline in the academic performance of students in secondary schools in the country. This poor performance has been recorded for some years by the examining bodies of Junior Secondary Certificate Examination (JSCE), senior secondary school examination conducted by WASSCE and NECO. This poor performance has been ascribed to non-availability of ICT resources and teachers‟ lack of the necessary digital competence to utilize ICT in instruction delivery (Onasanya, Fakomogbon, Shehu & Soetan, 2010).It has also been recorded in the past according to Akpan, Usoro & Akpan (2010), that students acquire skills in secondary schools which makes them fit into the society properly and the reverse is now the case. Several complains have been attributed to this among which is schools‟ lack of organization of workshops for teachers on the utilization of ICT in instructional delivery of content, teachers‟ enrolling for professional development programmes in which their employers gave no approval resulting to low input as expected . Hence, the essence of the study was to assess secondary school teachers’ use of Information and Communication Technology for teaching in secondary schools in Borno State

This study work would be significant and useful in teaching of secondary subjects using ICT. The findings will help teachers appreciate the value of ICT in instruction delivery and motivate them towards utilizing suitable ICT that will possibly reduce the failure in school examinations. The curriculum developers would find it usefulpossibly when reviewing the secondary school curriculum thereby stressing the need for its development in order to leapfrog into the information age. Furthermore, the study will be useful for researchers by forming a basis for further studies on ICT utilization in instructional delivery by teachers. Funding agencies of like interests, as well as professional bodies can support or formulate policies from recommendations made from the study.

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**Purpose of the Study**

The main purpose of this study is to assess secondary school teachers uses of ICT’s in Nigerian secondary schools. The specific objectives are to:

1. determine which ICTs do teachers have access to in their schools and what is the frequency of their access per week
2. determine the adequacy level of the various aspects of ICT availability/ access in respondents’ schools
3. determine the factors hindering teachers’ readiness and confidence in using ICT
4. determine the teachers’ perception about the perceived ease of using ICT
5. determine the teachers’ perception about the perceived usefulness of ICT

**Research Questions**

To achieve the stated objective of the study, the following research questions were raised to guide the study.

1. Which ICTs do teachers have access to in their schools and what is the frequency of their access per week?
2. What is the adequacy level of the various aspects of ICT availability/ access in respondents’ schools?
3. What are the factors hindering teachers’ readiness and confidence in using ICT?
4. What is the teachers’ perception about the perceived ease of using ICT?
5. What is the teachers perception about the perceive usefulness of ICT?

**Literature Review**

Several related empirical studies reveal the utilization of ICT in instructional delivery by teachers in schools. Though few international studies were reviewed, effort was made to address its impacts on Nigerian secondary schools. Subsequently, several studies carried out locally which have significant effect on utilization of ICT in instructions by teachers were also reviewed.

In a study carried out on ICT resource utilization by Jude and Dankaro (2012) in Benue State in which five schools and forty teachers were sampled, the study revealed that 87.5% of the sampled does not have computers/laptops. 80% of those who had laptops/computers were not connected to the internet, while 67.5% could not accessthe internet using personamobile device. Fakeye, (2010), also investigated English language teachers‟ knowledge and use of ICT in Oyo State and found that availability of computers and internet was non-existent in virtually all the schools studied. Chattel,(2012); Cheng, (2013); Chiemeke, (2014) in AbdusSalam, (2010) on teachers‟ use of ICT also concluded that most secondary schools have either insufficient or no ICT tools to cater for the increasing population of students in the schools and where they are available, they are by implication a matter of out-of-bounds to the students.

A study carried out in Jordan by Jawarneh, El-Hersh and Khazaleh, (2017), in exploring Vocational Education teachers‟ adoption of ICT reveals that teacher have both low to moderate ICT skills and the degree to which they incorporate ICT in their instruction. Lawal, Ahmadu and Dogara (2013) also conducted an investigation into the six selected secondary schools in Kano Metropolis. Finding among others revealed that half of the teachers were IT literate but very few used ICT in instruction.

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**Information Communication Technologies/ Technology**

Information communication technologies (ICTs) are information handling tools that are used to produce, store, and process, distribute and exchange information. These different tools are now able to work together, andcombine to form networked world- which reaches into every corner of the globe (UNDP Evaluation Office, 2001). It is an increasingly powerful tool for participating in global markets, promoting political accountability; improving the delivery of basic services; and enhancing local development opportunities (UNDP, 2006). ToOgunsola (2005:3) ICT “is an electronic based system of information transmission, reception, processing andretrieval, which has drastically changed the way we think, the way we live and the environment in which welive”. It can be used to access global knowledge and communication with other people (Ogunsola, 2005:3).Students who use ICTs gain deeper understanding of complex topics and concepts and are more likely to recallinformation and use it to solve problems outside the classroom (Apple Computer, 2002). In addition, throughICT, students extend and deepen their knowledge, investigation, and inquiry according to their needs and interestwhen access to information is available on multiple levels (CEO Forum on Education and Technology, 2001:8).

**Teachers and Instructional Applications of ICTs**

Many different types of technology can be used to support and enhance learning. Everything from video contentand digital moviemaking to laptop computing and handheld technologies has been used in classrooms. Similarly, new uses of technology such as pod casting are constantly emerging (Marshall, 2002). To Marshal, varioustechnologies deliver different kinds of content and serve different purposes in the classroom. Word processingand e-mail promotes communication skills; database and spreadsheet programmes promote organizational skills; and modelling software promotes the understanding of Science and Mathematics concepts. It is important to consider how these electronic technologies differ and what characteristics make them important as vehicles foreducation (Berker, 1994).

Technologies available in classrooms today ranges from simple tool-based applications (such as wordprocessors), to online repositories of scientific data. Others are primary historical documents, handheldcomputers, closed-circuit television channels, and two-way distance learning classrooms. Prensky (2005) assertsthat even the cell phones that many now carry with them can be used to learn. According to Lei and Zhao (2006) each technology is likely to play a different role in students learning. Rather than trying to describe the impact ofall technologies as if they were the same, researchers need to think about what kind of technologies are beingused in the classroom and for what purposes. Two general distinctions could then be observed from theliterature. Students can learn from computers where technology are used essentially as tutors and serve toincrease student’s basic skills and knowledge. Moreover, they can learn with computers where technology isused as tool that can be applied to a variety of goals in the learning process and can serve as a resource to helpdevelop higher order thinking, creativity and research skills (Reeves, 1998; Ringstaff and Kelley, 2002).

According to Murphy, et al., (2001) cited in Kiridis, Drossev and Tsakiridou (2016), the primary form of student learning from computers is described asDiscrete Educational Software (DES), Integrated learning system (ILS), Computer-assisted Instruction (CAI), and Computer-based instruction (CBI). These software applications are also the most widely availableapplications of educational technology in schools today, along with word-processing software, and have assistedin classroom for more than 20 years (Becker, Ravity and Wong, 1999). Murphy et al., (2001) explains thatteachers use DES not only to supplement instruction, as in the past, but to introduce topics, provide means forself-study, and offer opportunities to learn concepts otherwise inaccessible to students. The software alsomanifests two key assumptions about how computers can assist learning. First, the users’ ability to interact withthe software is narrowly defined in ways designed specifically to promote learning with the tools. Second, computers are viewed as a medium for learning, rather than as tools that could support further learning.As DES is recognised as the commonly used approach to computer use in student learning, in more recent years, use of computers in schools has grown more diversified as educators recognize the potential of learning withtechnology as a means for enhancing students reasoning and problem solving abilities. Zhang (2005) notes that “this shift which has been driven by the plethora of new information and communication devices nowincreasingly available to students in school and at home, each of which offers new affordances to teachers andstudents alike for improving student achievement and for meeting the demand for 21st century skills.”

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**Factors Contributing to Using ICT in the Classroom**

Cox, Preston and Cox (1999), stated that there are a number of factors which have been identified whichmight influence and support teachers in using ICT in the classroom. In order to investigate these factors furtherin relation to teachers' ICT use, the study make use of the technology acceptance model TAM developed byDavis, Bagozzi and Warshaw (1989) which was an adaptation of theory of reason action by Ajzen and Fisbein(1980) to investigate the reasons why teachers use ICTs. Their model links the perceivedusefulness and ease of use with attitude towards using ICT and actual use (system use). They tested this model with 107 adult users, who had been using a managerial system for 14 weeks. They found that people's computeruse was predicted by their intentions to use it and that perceived usefulness was also strongly linked to theseintentions.

**Perceived Ease of Use and Usefulness**

Previous studies(Dankaro, 2012; fakeye, 2010; Chatell 2012)suggests a number of factors which have been identified which relate to the perceivedease of use of ICT and a wide range of skills and competencies which teachers felt they needed inorder to find ICT easy to use (Watson, 1993). Some of these factors are regular use and experience of ICT outside the classroom, ownership of a computer, confidence in using ICT amongst others.

If teachers see no need to question or change their professional practice according to TAM then they are unlikelyto adopt the use of ICT. However, if they perceive ICT to be useful to them, their teaching and their students' learning, then according to the empirical evidence of previous studies (Cox, Preston and Cox, 1999) they aremore likely to have a positive attitude to the use of ICT in the classroom. A number offactors contributes to teacher’s perceived usefulness of ICT. Some of these factors are makes my lessons more interesting, makes my lessons more diverse, Gives me more confidence, and the host of others.

Teachers' attitudes too many of these factors will depend upon how easy they perceive using ICT to be on apersonal level as well as for teaching in the classroom. According to Davis et al's technology acceptance model, the more positive the responses to the above factors of perceived usefulness and perceivedease of use, then the more positive the attitudes of teachers will be to the use of ICT and the more likely they willbe to use ICT in their teaching.

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**Methodology**

**Design of the Study**

This study employed a descriptive survey method. This method was used to allow the researcher a vividdescription of how Nigeria secondary school teachers are making use of ICTs.

**Population and Sample**

The population of this study comprised all government secondary school teachers in Biu Education Zone, of Borno state, Nigeria where the study was conducted. Seventeen government secondary schools were randomly selected.A census of teachers in each of the school was taken. These gave a total of 435 teachers which consists of 294 males and 141 females. Their age ranged between 25 – 45 years with a mean age of 35 years. All the 435 teachers were used as the sample of the study

**Instrument for Data Collection**

A modified instrument tagged Teachers ICT use survey adapted from ICT survey indicator for teachers and staffby UNESCO (2004) and ICT Teachers Survey by New Zealand Ministry of Education MINEDU (1999) wasused to gather data for the study. The instrument consists of two sections. The section 1 addressed the respondents’demographic information like age, sex, name of school, the class taught etc. The second section contains the questionnaire items that addressed the research questions. These are 10 in number. Respondents were required to respond to items 1-8 by ticking as applicable while item 9 and 10 are likert type response format in which the respondents were to choose from stronglyagree, agree, neutral, disagree, and strongly disagree. To ascertain the reliability of the instrument aftermodification, it was administered on 35 respondents which were not part of the sample using test- retest method.The reliability co-efficient through a cronbach alpha yielded r = 0.84.

**Procedure**

All the 435teachers were administered the teachers ICT use survey in their respective schools with thepermission granted by the various authorities of the schools. The administration took place after the school hourin each of the school. The entire respondents were informed about the date of the exercise in advance. Out of the 435 instrument administered, only 429 were retrieved for the analysis. This translates to 98.6% retrieval.

**Method of Data Analysis**

Data collected on the study were analyzed using frequency count, percentages and mean.

**Results**

The results of the analysis are presented in the tables based on the research questions asked.

**Research Question 1**

Which ICTs do teachers have access to in their schools per week? The result is presented in Table 1a and 1b.

**Table 1a: Teachers Access to ICTs**

|  |  |  |
| --- | --- | --- |
| **ICT’s** | **No of response** | **% of ICT access per week** |
| Computers | 193 | 45.00 |
| E-mail | - |  |
| Digital Camera | 37 | 8.62 |
| Data Projector | 63 | 14.68 |
| Internet | - |  |
| Scanner | 49 | 11.40 |
| Interactive Response System  ***Bwala, Hajja Alheri & Ibrahim*** | - | - |
| Video Equipment | 87 | 20.30 |
| Total | 429 | 100 |

Table 1a shows that 193 (45%) of the teachers who took part in the study indicate computer is the type ofICTs they have access to in their schools, 87 teachers (20.3%) indicate they haveaccess to video equipment, 63 (14.68 %) teachers indicated data projector and 37teachers (8.63%) indicate they have access to digital cameras. No teacher indicate having access to the Internet, e-mail and interactive response system. The result indicates that respondents have access to ICTsexcept that they do not have access to e-mail, interactive response system and the Internet. This may be because their schools are not connected.

**Table 1b: Teachers frequency of access to ICTs**

|  |  |  |
| --- | --- | --- |
| **Hours of Access/ week** | **No of response** | **% frequency of ICT access for teaching** |
| 0-5 hours | 107 | 25.00 |
| 6- 10 hours | 41 | 10.00 |
| 11-15 hours | 149 | 34.00 |
| 16-20 hours | 47 | 11.00 |
| 21 hour and above | 86 | 20.00 |
| Total | 429 | 100 |

Table 1b shows that the majority of the teachers 149 (34 %) access ICTs in their schools between 11 – 15hours per week. The table also reveals that 107 teachers (25 %) access ICTs between 0 – 5 hours per week, only 20% of the teachers access ICTs 21 hours and above per week. This indicates that teachers have access toICT at their various schools only that variation exists in the frequency to which they access them.

**Research Question 2**: What is the adequacy level of the various aspects of ICT availability/ access inrespondents’ schools? To answer this question respondents were asked to rate the adequacy of various aspect ofICTs availability in their schools on a five point scale. The result is presented in Table 2.

**Table2: Adequacy Level of the various aspects of ICTs in the Respondents’ Schools**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Ratings | Software | Computer  hardware | Computer  consumable | ICT  technical  Support | Internet  Access | Others e.g. Data  projector, Digital  camera etc |
| Very good | 28 | 24 | 29 | 11 | 0 | 25 |
| Good | 26 | 20 | 26 | 13 | 0 | 27 |
| Satisfactory | 22 | 17 | 24 | 16 | 0 | 28 |
| Poor | 3 | 12 | 6 | 30 | 36 | 8 |
| V.poor/  Non  existence | 2 | 6 | 2 | 27 | 40 | 2 |

Table 2 shows that computer hardware, software, consumable and others received higher rating of very good, good and satisfactory than ICT technical support and Internet access.This indicates that technical support and Internet access are lacking. This may be due to nonexistence of theInternet and non-availability of ICT technician in the country generally.

**Research Question 3**: What are the factors hindering teachers’ readiness and confidence in using ICT?

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**Table 3: Factors hindering teacher’s readiness and confidence of using ICTs**

|  |  |  |
| --- | --- | --- |
| **Problems** | **No of respondents** | **%** |
| Teachers lack of expertise with ICT | 140 | 32.6 |
| Lack of confidence in using ICT | 26 | 14.5 |
| Insufficient knowledge of appropriate software | 97 | 22.6 |
| Insufficient knowledge of how to use ICT equipment | 41 | 9.6 |
| Lack of knowledge of how to evaluate the use and the role play by ICT inteaching and learning. | 125 | 29.1 |
|  | 429 | 100 |

Table 3 shows that the most prominent factor hindering teacher’s readiness and confidence in using ICT is lack of expertise (140, 33.8%). Furthermore, lack of knowledge on how to evaluate theuse and role play by ICT in the teaching and learning at the secondary school level was identify as another factorby 125 teachers (29.1%). The result also reveals that 97 teachers (22.6%) indicated insufficient knowledge ofappropriate software as factor hindering the readiness of using ICT.

**Research Question 4**: What is the teachers’ perception about the perceived ease of using ICT?

**Table 4: Teachers perceived ease of using ICT**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | **Perceived ease of use items** | SA | A | N | DA | SD | Mean | Remark |
| 1 | Using ICT makes it easier to control the class. | 197 | 188 | 20 | 20 | 4 | 4.30 | Agree |
| 2 | ICT makes the lesson more easier | 183 | 200 | 18 | 24 | 22 | 4.29 | Agree |
| 3 | ICT makes preparing the lesson more easier | 202 | 165 | 26 | 20 | 16 | 4.21 | Agree |
| 4 | Hardware and software problems often disrupt the lesson. | 33 | 44 | 20 | 175 | 147 | 2.50 | Disagree |
| 5 | Using ICT in teaching is expensive. | 31 | 25 | 17 | 186 | 170 | 2.00 | Disagree |
|  | **Grand Mean** |  |  |  |  |  | **3.50** |  |

Table 4 shows that teachers agree with item 1, 2 and 3 while disagree with item 4 and 5. However, since the grand mean stood at, it meansthe overall implication isthat the teachers perceived ICT as very easier to use in teaching their lesson.

**Research Question 5:** What is the teachers perception about the perceive usefulness of ICT?

**Table 5:** Teachers Perceived Usefulness of ICT

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Perceived usefulness items** | SA | A | N | DA | SD | Mean | Remark |
| 1 | Using ICT makes lesson more interesting. | 181 | 157 | 69 | 12 | 10 | 4.14 | Agree |
| 2 | Using ICT in teaching is enjoyable | 201 | 170 | 40 | 11 | 07 | 4.46 | Agree |
| 3 | Using ICT makes lesson more fun. | 187 | 190 | 30 | 12 | 10 | 3.80 | Agree |
| 4 | Using ICT makes lesson more diverse. | 211 | 143 | 10 | 09 | 06 | 4.38 | Agree |
| 5 | Using ICT improves presentation of materials | 184 | 211 | 12 | 10 | 12 | 4.76 | Agree |
| 6 | Using ICT makes lesson more easier | 170 | 198 | 43 | 10 | 08 | 4.20 | Agree |
| 7 | Using ICT increases students’ motivation | 200 | 150 | 11 | 12 | 06 | 3.90 | Agree |
| 8 | Using ICT enhances students’ learning. | 180 | 210 | 16 | 11 | 12 | 4.25 | Agree |
|  | **Grand Mean** | | | | | | **4.24** |  |

The result in Table 5 shows that the teachers agree to all the 8 items as benefits of using ICT in teaching. The grand mean stood at indicating that the teachers perceived ICT as being useful in their lesson.

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**Discussion of Findings**

On the issue of access to ICT, the result generally showed that aside of otheridentified ICTs; it’s only the Internet and e-mail facilities that respondents didn’t have access to. This is inagreement with the findings of Dankaro (2012), Fakeye (2010) Chatell (2012) who in their individual findings reported less use of theInternet and e-mail by teachers. This result may be due to the fact these facilities are not available for access or perhaps theteachers lack the skills to access them. Moreover, some government considers providing Internet connectivity inschools as being expensive and difficult to maintain.

On frequency of access, the result generally shown that a considerable number of teachers access ICT between11- 15 hours per week. This is an indication that using ICT by the Nigeria secondary school teachers is relativelyhigh. This corroborates the report by (Gray and Souter, 2004; Abdulsalam, 2010; Cheng, 2013) that teachers came out positively with regards tothe use of ICTs. It also confirms the assertion that availability usually determines access. If the ICTs areavailable, this will motivate the teachers to access them than when they are not available or available but not insufficient quantity and quality. The study also shows that ICT technical support and Internet facility are lacking in all the respondents schools, while other facilities like hardware, software, computer consumables and other ICT equipment like digitalcamera and data projector are adequate and available. The report by Gordon University Aberdeen (2004) thatteachers were reasonably confident in their use of ICT but felt that they needed much more in the way of supportand professional development to maximize their use of ICT in the classroom support the present findings. Thelack of ICT technical support therefore may be attributed to limited number of people who are professional in theuse of ICT equipment, couple with the fact that integration of ICT in the school curriculum in Nigeria andAfrica generally has just begin. People just begin to develop interest in the area and take it as chosen field ofstudy. It is assumed that at the passage of time more expert and ICT technician will begin to emerge. It shouldbe noted that when planning introduction of new technology or when it is being used and implementing technicalsupport or support services generally are very important. It is important to bear it in mind that it is not every useror every member of the social system where new technology is being used that has good knowledge of usingthe new technology. This is the more reason why support services need to be provided particularly for those whohave less or no knowledge of the technology and how it works.

The finding that teacher’s expertise and lack of knowledge to evaluate the use and role of ICT in teaching as thetwo prominent factors hindering teacher’s readiness and confidence in using ICT support. Similarly, (JISC,2004) in their study on developing maturity in learning technology revealed that the most significant barriersidentified are linked to staff attitude and training staff in the use of ICT, access and ICT skill in general.Moreover (Marshall, Elgort & Mitchell, 2003) reported similarly that staff continues to identify a lack of time asa barrier to the use of technology. While this has been interpreted to mean that staff have not have had the timeto acquire the necessary skills in the use of technology in teaching, it now seems more likely that it reflects asense of priority conveyed by the institution and a desire by academics to see a return on the investment of theirtime in developing their teaching delivery with technology. Previous surveys of academic staff attitudes to theuse of technology have also repeatedly identified time and an absence of such examples (e.g. skills and knowledge) as significant barriers to technology adoption (Marshall, 2000).

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The perception of ICT as being easier to use by teachers in this study is also relevant to the findings by (Ogunsola, 2005; Osakwe, 2018). This is due to the fact that all factors teachers consider as making it easier to use ICTs was considered byCox et al. as contributing to the continuous use of ICT by teachers in their study, and which were also found tobe most important to these teachers in their teaching. The factors are: making the lessons more interesting, easier, more fun for them and their pupils, more diverse, more motivating for the pupils and more enjoyableamong others. Additionally, it should be noted that in Technology Acceptance Model by (Davis et al., 1989), oneof the basic theme examined was perceived ease of use. This according to Davis usually influence peopleacceptance to use a particular technology. Hence, the result of this study actually agrees with TAM position.Teachers also perceived ICT as being very useful in this study. This may be connected to the fact that it isperceived as improving learner’s performance; and more so that teachers are affected by knowledge about theirown subject.

**Conclusions and Implications**

There is now an increasing awarenessregarding the potentials of ICTs in learning. Many private and public secondary schools in the country are nowinfusing ICT into their teaching activities. The computers and Internet facilities in the homes of the affluent studentscomplemented by the cybercafé proliferating the entire country have provided hundreds of thousands of Nigerian secondary school students an unprecedented opportunity to join millions of their colleagues around the globe tosurf and navigate.

Meanwhile, this study has shown generally that ICT now have far reaching implications in teaching and learningat the secondary school level in Nigeria. This is because teachers themselves have now perceived it usefulness. However, we should not forget the fact that it’s not every teacher in the country today that is now applying theuse of ICTs during the lesson. The need for further development and use among teachers particularly at this levelis highly necessary.

**Recommendations**

1 Employer of labour should take advantage of the several on-going in-service training on ICT by participating withenthusiasm and partnering with organizers to expand the tenure of such training or workshops.

2 Nigerian governments should provide computers, Internet and other ICTinfrastructure in all the government own schools so as to encourage teachers to use them.

3 Teacher training andprofessional development oriented policies should support ICT-related teaching models that encourage bothstudents and teachers to play an active role in teaching/learning activities. Emphasis must be placed on thepedagogy behind the use of ICTs for teaching/learning. Teachers need to adopt, develop and support a pedagogicculture that develops supportive practices for students’ and encourages own theories in teaching/learningactivities. It should be linked to the development of life-long learning and professional practices that enableteachers to keep in touch with ICT developments, new knowledge and research on teaching/learning.

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**UTILIZATION OF SOCIAL MEDIA FOR RESEARCH BY VOCATIONAL EDUCATION GRADUATING STUDENTS OF UNIVERSITY OF CALABAR**

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**Abstract**

*The study was carried out to determine the extent of utilization of social media for research by Vocational Education graduating students of the University of Calabar. Four research questions were posed and four null hypotheses were formulated to guide the study. The study adopted a descriptive survey design. The population for the study consisted of 99 Vocational Education graduating students of University of Calabar. The instrument for data collection was a structured and validated questionnaire developed by the researchers. Data collected were analysed using mean and standard deviation to answer the research questions while Pearson Product Moment Correlation (PPMC) was used to test the null hypotheses at .05 level of significance. The results revealed, among others, that the University of Calabar Vocational Education graduating students’ extent of utilization of social media for research is averagely low, and that there is no significant relationship between utilization of social and Vocational Education graduating students’ research. Based on the findings, it was recommended, among others, that the National Universities Commission (NUC) should ensure the inclusion of social media utilization in the curriculum of all programmes in the University.*

**Key words:** TVET, Social Media, Social Media Networking, Research

**Introduction**

The global society has witnessed the advent of the internet which has increased the utilization of social media in different sphere of human endeavour including Technical Vocational Education and Training (TVET) delivery.Technical Vocational Education and Training (TVET) according to UNESCO(2009) in Ogbuanya and Udoudo (2015) is educational programme that provide participants with skills, knowledge and aptitudes that enable them to engage in productive work, adapt the rapidly changing labour markets and economies, and participate as responsible citizens in their respective societies.Okute, Enang and Asuquo (2017) stressed that in Nigeria, university TVET programmes provide high-level manpower with capacity and analytical skills to drive local and global economies, support the civil society, teach the children, deliver efficient services and make important decisions that affect the entire nation. TVET is used in this context to mean specialized educational programme that equips the recipients with functional skills, knowledge, and values necessary to produce the required calibre of workforce to propel the nation’s economy. It is a type of education that prepares the recipients to be efficient and functional citizens who can adapt to dynamic society and utilize innovative approaches to solving societal problems, including the use of social media.

Social media have become so integrated to human daily activities. Kapla and Heanlein (2010) defined social media as a group of internet-based application that build on the ideological and technological foundation of web 2.0 and that allows the creation and exchange of user-generated content.Social media, according to Enang (2014), are computer-based online community of individuals who exchange messages, share information, and, in some cases, cooperate on joint activities. Enang, Okute, and Ebgri (2014) stated that social media sites are mostly the common and one of the most educative of internet services in our society these days.Social media are a collection of online communication channels dedicated to community based input, interaction, content sharing and collaboration.Contextually, Social media refer to the array of computer mediated technologies that facilitate the creation and sharing of information, ideas, career interests and other forms of expression via virtual communities and networks. Social media depend on mobile and web based technologies to create highly interactive platforms through which individuals and communities share, co-create, discuss and modify user-generated content.

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Social mediatechnologies provide people with the acquisition of interests in activities – uploading photos and videos, update status, make friends, and other additional activities. Social media sites likeweb 2.0, facebook, whatsAap, YouTube among others have involved millions of users in their day-to-day lives.Brown and Adlier (2008) opined that the use of web 2.0 technologies encourage and enable teachers and learners to share ideas and collaborate in innovative ways. Richardson (2009) also asserted that Web 2.0 has the potential to create more interactive and powerful learning environments in which learners become knowledge creators, producers, editors and evaluators. Lambert and Kidds (2008) in their views stated that while Web 2.0 has the potential for instructions uses, it is limited in scope, and that vast majority of educators still have little or no experience with these new tools.

WhatsApp has academic advantages such as accessibility of learning maerials, teachers availability and continuation of learning beyond class hours, and is rated the most downloaded application in 127 countries (Cohavi, 2013); with an average of 31 million messages being sent everyday (Tzuk, 2013). Kousha, Thelwall and Abdoll (2012) pointed out that although online videos are increasingly used by academic for informal scholarly communication and teaching, the extent to which YouTube videos are used for research is unknown. Laurier (2013) observed a generally low level of YouTube for research. Furthermore, Zhu (2017) posited that very little attention has been paid to academics’ use of YouTuble and video sharing services for research purposes. The use of Facebook, according to Ulusu (2010), is time-consuming; leads to procrastination and changing priorities (Vivian, 2011); waste of money spent on surfing and even addiction (Kuss & Griffiths, 2011). However, Lam (2012) believed that Facebook is not only a social network service, but also its benefit can help motivate students’ learning if properly incorporated in learning. Obviously, Facebook can be positively used to promote collaboration, sense of community and communication between teachers and students.

Most social media communicate via status-message updates and exchange data in text, picture and video form. A basic social media networking software/site allows friends to comment on one another's profiles, send private messages within the network, and traverse the extended web of friends visible in each member's profile.Operating a social media networking service involve the creation and maintenance of a unique personal profile that is linked with other members thus enabling a user to specifically connect and communicate with other users that are connected to the specific network through the internet (Enang, 2014).

Research report is one of the mandatory requirements for graduating students in all tertiary institutions in Nigeria. Egbri (2015) stated that there is heavy dependence on the Internet by researchers to access free online journals, magazines, graphics, voice, video information/ illustration and other research information through its numerous resources. More so, the Internet has become the most economical, rich, vast, easy and instantly accessed for research information anytime, anywhere even at the confinement of individual’s home or bedroom .

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Through social media technologies, researchers can source and obtain viable information, disseminate their work, as well as access the work of others and communicate with one another on scholarly issues. Despite the vast opportunity provided by social media for interaction and acquisition of information, it is not certain if vocational education graduating students utilize social media creatively for research purposes. It is based on this premise that the researchers deem it fit to carry out this study on the extent of utilization of social media for research by Vocational Education graduating students of the University of Calabar. Specifically the study sought to;

1. Ascertain the utilization of Web 2.0 for research by vocational education graduating students of the University of Calabar.
2. Examine the utilization of WhatsApp for research by vocational education graduating students of the University of Calabar.
3. Ascertain the utilization of YouTube for research by vocational education graduating students of the University of Calabar.
4. Ascertain the utilization of Facebook for research by vocational education graduating students of the University of Calabar.

**Research Questions**

1. To what extent do vocational education graduating students use Web 2.0 for research?
2. To what extent do vocational education graduating students use WhatsApp for research?
3. To what extent do vocational education graduating students use of YouTube for research?
4. To what extent do vocational education graduating students use of Facebook for research?

**Hypotheses**

**Ho1:** There is no significant relationship between utilization of Web 2.0 and vocational education graduating students’ research.

**H02:** There is no significant relationship between utilization of WhatsApp and vocational education graduating students’ research.

**H03:** There is no significant relationship between utilization of YouTube and vocational education graduating students’ research.

**H04:** There is no significant relationship between utilization of Facebook and vocational education graduating students’ research.

**Methods**

The research design adopted for the study was descriptive survey design. The research was carried out in the University ofCalabar (UNICAL) in Cross River State., Nigeria. The University is located partly in Municipal and Calabar South Local Government Areas, with 75% of the university located in Calabar South Local Government of Cross River State, South-South Nigeria. The population of this study was 99 vocational education graduating students. The major instrument that was used for data collection was the questionnaire titled‘Utilization of Social Media for Research Questionnaire’ (USMRQ). The researchers developed the questionnaire to investigate utilization of social media for research by vocational education graduating students in University of Calabar. The USMRQ was made up of two sections. Section A and B, section A was developed to collect personal data of the respondents while section B dealt on the items of information based on the hypothesis. The instrument was developed on a five-point scale of Very Highly Utilized (VHU), Highly Utilized (HU), Averagely Utilized (AU)Lowly Utilized (LU) and Very Lowly Utilized (VLU). The questionnaire was validated by three experts: two from the Department ofVocational Education, and one from Measurement and Evaluation, Department of Educational Foundation, University of Calabar. The research questions were answered using mean and standard deviation. Any variable with a mean score of 3.00 and above was accepted as agreed while any variable with a mean below 3.00 indicated a negative response. The null hypotheses were tested using Pearson’s Product Moment Correlationat .05 level of significance. In testing the null hypotheses, if the calculated r-value was greater than the r-critical value, the null hypothesis was rejected. The data for the study was analyzed using the IBM Statistical Package for Social Sciences (SPSS) 20.0 Version.

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**Results**

**Table 1:** Mean Rating and Standard Deviation of the responses of vocational education

graduating students’ utilizationof web 2.0 for research

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Item Statements on utilization of Web 2.0** |  | **SD** | **Remarks** |
|  | Utilization of Web 2.0 to |  |  |  |
| 1 | get information for academic and research purpose | 4.57 | .832 | VHU |
| 2 | collaborate with other students for research | 4.11 | 1.030 | HU |
| 3 | access educational information for research | 2.43 | 1.225 | LU |
| 4 | access research materials from institutions | 2.45 | 1.116 | LU |
| 5 | encourage group study among students for research | 3.01 | 1.281 | AU |
| 6 | enhance interaction among students for research | 2.44 | 1.224 | LU |
| 7 | communicate with my supervisor for research purpose | 2.43 | 1.225 | LU |
| 8 | bridge the gap between lecturer and students for research purpose | 2.48 | 1.160 | LU |
| 9 | Obtain data from respondents for research purpose | 2.40 | 1.113 | LU |
| 10 | Get research materials from online library | 2.46 | 1.207 | LU |
|  | **Cluster Mean** | **2.88** | **1.14** | **AU** |

Table 1 shows the mean rating and standard deviation of the responses of vocational education graduating students’ use of web 2.0 for research ranging from 2.40 to 4.57. A mean value of 4.57 indicates that web 2.0 is very highly utilized for research. The table also show a mean value of 4.11 indicating highly utilized for research; while item 5, with a mean of 3.01 shows that web 2.0 is averagely utilized. However, 7 of the identified web 2.0 (items 3, 4, 6, 7, 8, 9, and 10) with mean values ranging from 2.40 -2.48 are lowly utilized for research by vocational education graduating students. The values of the standard deviations which ranged from 0.83 to 1.28 revealed that the respondents are not far from each other in their opinion. Nevertheless the overall response revealed averagely utilized with a cluster mean of 2.88 and Standard Deviation of 1.14 indicating that vocational education graduating students averagely utilize (AU) web 2.0 for research.

**Hypothesis One**

**H01:**There is no significant relationship between utilization of Web 2.0 and vocational education graduating students’ research.

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The Pearson’s product moment correlation was used for the analysis. The result is presented in Table 2.

**Table 2:** Pearson product moment correlation analysis of the relationship between utilization of Web 2.0 and vocational education graduating students’ research (N=99).

Variables ∑X ∑X2

∑Y ∑Y2 ∑XY r-cal

Utilization of web 2.0 1794 27504

28638 0.556\*

Research 1893 30401

\*Significant at 0.5 level, critical r = 0.195, df = 97

The result of the analysis in table 2 shows that the calculated r-value of 0.556 is significantly greater than the critical r-value of 0.195 when tested at 0.5 level of significance with 97 as degree of freedom. This implies that the result is significant. Therefore, the null hypothesis was rejected. It means that there is a significant relationship between utilization of Web 2.0 and vocational education graduating students’ research.

**Table 3:** Mean Rating and Standard Deviation of the responses of vocational education

graduating students utilization of WhatsApp for research

| **S/N** | **Item Statements on utilization of WhatsApp** |  | **SD** | **Remarks** |
| --- | --- | --- | --- | --- |
|  | Utilization of WhatsApp to: |  |  |  |
| 1 | Get approval from supervisor on research topic | 2.32 | 1.30 | LU |
| 2 | Communicate with supervisor for corrections of research topic. | 2.27 | 1.25 | LU |
| 3 | Submit research work to supervisor | 2.29 | 1.26 | LU |
| 4 | Obtain research information from respondents. | 2.30 | 1.28 | LU |
| 5 | request for research information from other students. | 3.56 | 1.28 | HU |
| 6 | retrieve research information from supervisor | 2.29 | 1.27 | LU |
| 7 | Send research questionnaire for validation. | 2.49 | 1.19 | LU |
| 8 | administer/retrieve research instrument or questionnaire on/from respondents. | 1.49 | .82 | VLU |
| 9 | Communicate to students on issues that bother on research work. | 2.63 | 1.22 | AU |
| 10 | share research contents for public view and criticism. | 2.36 | 1.22 | LU |

|  | **Cluster Mean** | **2.40** | **1.21** | **LU** |
| --- | --- | --- | --- | --- |

The data on table 2 are the mean responses of vocational education graduating students’ utilization of whatsapp for research.The mean values of all the items range from 0.82 to 1.30, while the standard deviation ranges from 1.82 to 1.30. The table reveals that only item 5 is highly utilized for research, with a mean value of 3.56. The table also indicated that item 9 with a mean value of 2.63 is averagely utilized for research, while five items (1, 2, 3, 4, 6, and 7), with mean values of 2.32, 2.27, 2.29, 2.30, 2.29 and 2.49 are lowly utilized for research by the students. However, the table also revealed that item 8 with a mean of 1.49 is very lowly utilized by the students for research. However, the cluster mean of 2.40 and a standard deviation of 1.21 indicates that vocational education graduating student’s lowly utilized WhatsApp for research.

**Hypothesis Two**

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**H02:** There is no significant relationship between utilization of WhatsApp and vocational education graduating students’ research.

The Pearson product moment correlation was used for the analysis. The result is shown in table 4.

**Table 4:** Person product moment correlation analysis of the relationship between utilization of

WhatsApp and vocational education graduating students’ research. (N=99)

Variables ∑X ∑X2

∑Y ∑Y2 ∑XY r-cal

Utilization of WhatsApp 1556 20704

24720 0.326\*

Research 1893 30401

\*significant at o.5 level, critical r =0.195, df=97

The result of the analysis in table 4 reveals that the calculated r –value of 0.326 is significantly greater than the critical r-value of 0.195 when tested at 0.5 level of significance with 97 degree of freedom. Since the calculated r-value is greater than the critical value, the null hypothesis was rejected. This implies that there is a significant relationship between WhatsApp utilization and vocational education graduating students’ research.

***Table 5:*** Mean Rating and Standard Deviation of the responses of vocational education

graduating students’ utilization ofYouTube for research

| **S/N** | **Item Statements on utilization of YouTube for Research** |  | **SD** | **Remarks** |
| --- | --- | --- | --- | --- |
| 1 | Watch educational videos for research | 3.74 | 1.31 | HU |
| 2 | Learn guidelines on research without my supervisor | 3.80 | 1.22 | HU |
| 3 | Acquire relevant information for research purpose | 3.48 | 1.32 | AU |
| 4 | Get more understanding on research through videos | 3.48 | 1.31 | AU |
| 5 | Watch educational research platform from other institutions | 3.33 | 1.30 | AU |
| 6 | improve academic performance for research purposes | 2.47 | 1.17 | LU |
| 7 | make learning more interesting and encouraging during research work | 2.44 | 1.24 | LU |
| 8 | learn with YouTube than attending lectures | 2.47 | 1.18 | LU |
| 9 | Enhance education research for final presentation | 3.55 | 1.29 | HU |
| 10 | obtain good knowledge of vocational education and research | 2.47 | 1.18 | LU |
| 11 | Learn how oral presentations are made during research | 2.42 | 1.13 | LU |
| 12 | Demonstrate how to write good research | 1.43 | .73 | VLU |
|  | **Cluster Mean** | **2.92** | **1.20** | **AU** |

The mean responses and standard deviation of vocational education graduating students’ responses on the utilization of Youtube for research is presented in table 3. The mean values of all the items range from 1.43 to 3.80, while the values of the standard deviation range from 0.73 to 1.32. The table revealed that Youtube is highly utilized for items 1, 2, and 9 with their mean which ranged from 3.74, 3.80 and 3.55. The table also shows that Youtubeis averagely utilized for items (3, 4 and 5) with mean values ranging from 3.33 to 3.48. The mean values of items 6, 7, 8, 10 and 11which ranged from 2.42 to 2.47 showthat Youtube is lowly utilized for those items while the table also revealed that item 12, with a mean value of 1.43 was very lowly utilized for research. The cluster mean of 2.92 and standard deviation of 1.20 reflected in the table that Youtube is averagely utilized (AU) for research by vocational education graduating students

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**Hypothesis three**

**H03:** There is no significant relationship between utilization of YouTube andvocational education graduating students’ research

The Pearson product moment correlation was used for the analysis. The result is presented in table 7 below.

**Table 6**

Pearson product moment correlation analysis of the relationship between utilization of YouTube and vocational education graduating students’ research (N=99)

Variables ∑X ∑X2

∑Y ∑Y2 ∑XY R-Value

Utilization of YouTube 1574 20952

24849 0.471\*

Research 1893 30401

\*significant at 0.5 level, critical r=0.195, df=97

The result of this tested hypothesis presented in table 6 revealed that the calculated r-value of 0.471 is significantly greater than the critical r- value of 0.195 when tested at 0.5 level of significant with 97 as degree of freedom. Since the calculated value is greater than the critical value, the null hypothesis was rejected. This means that there is significant relation between YouTube utilization and vocational education graduating students’ research.

**Table 7:** Mean Rating and Standard Deviation of the responses of vocational education

graduating students utilization of Facebook for research

| **S/N** | **Item Statements on utilization of Facebook** |  | **SD** | **Remarks** |
| --- | --- | --- | --- | --- |
|  | Utilization of Facebook to |  |  |  |
| 1 | Obtain education materials for research | 4.25 | 1.18 | HU |
| 2 | connect with friends for research purpose | 2.45 | 1.14 | LU |
| 3 | Access academic materials through Facebook pages | 4.32 | 0.95 | HU |
| 4 | Get academic materials from other students | 4.05 | 1.17 | HU |
| 5 | Contact my supervisor for correction of research work | 2.31 | 1.13 | LU |
| 6 | Connect with friends to get research materials | 2.28 | 1.11 | LU |
| 7 | To distribute information on my research work | 2.40 | 1.16 | LU |
| 8 | Create group with other students for research purpose | 2.15 | 1.12 | LU |
| 9 | Collaborate with coursesmates for research purpose | 2.19 | 1.16 | LU |
| 10 | To submit research materials to supervisor | 1.47 | 0.70 | VLU |
| 11 | Create pages and share information with audience for research. | 2.29 | 1.16 | LU |
| 12 | Communicate and share information with people of like interest for research. | 1.49 | 0.74 | VLU |
| 13 | chat with persons and obtain information for research purpose | 1.42 | 0.71 | VLU |
| 14 | Participate in video chat and share information for research. | 1.48 | 0.69 | VLU |
| 15 | Exchange messages between people for research purposes. | 2.00 | 1.22 | LU |
|  | **Cluster Mean** | **2.44** | **1.02** | **LU** |

The data presented in table 7 shows that items 1, 3, and 4 with their mean scores ranging from 4.05 to 4.32 are highly utilized by vocational education graduating students for research. The Table also reveals that items 2, 5, 6, 7, 8, 9, 11, and 15 with their mean which ranged from 2.00 to 2.45 were lowly utilized for research. However, items 10, 12, 13, and 14 with their mean ranging from 1.42 – 1.49 were very lowly utilized by the students for research. The cluster mean of 2.44 showed that Facebook is lowly utilized by the students for research. The standard deviation of each of the items as well as the overall standard deviation which ranged from 0.72 to 1.22 implies that all the respondents have similar opinion on utilization of Facebook for research by vocational education graduating students.

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**Hypothesis four**

**H04:** There is no significant relationship between utilization of Facebook andvocational education graduating students’ research.

The Pearson productmoment correlation analysis was used for the analysis. The result is presented in table 8.

**Table 8:** Pearson product moment correlation analysis of the relationship between utilization of

Facebook and vocational education graduating students’ research (N=99).

Variables ∑X ∑X2

∑Y ∑Y2 ∑XY R-Value

Utilization of YouTube 1764 28104

28742 0.656\*

Research 1893 30401

\*significant at 0.5 level, critical r=0.195, df=97

The result of the analysis in table 8 shows that the calculated R-value of 0.656 is greater than the critical r-value of 0.195 at 0.5 level of significance with 97 degree of freedom. This means that there is a significance relationship between utilization of Facebook and vocational education graduating students’ research. The null hypothesis was therefore, rejected.

**Discussion of findings**

The findings of this study are discussed in line with the research questions and hypotheses which are presented as follows:

On the utilization of Web 2.0 for research, the findings in Table 1 revealed that vocational education graduating students very highly utilize Web 2.0 to get information for academic and research purposes ( = 4.57); students highly utilize Web 2.0 to collaborate with other students ( = 4.11); and students averagely utilize Web 2.0 to to encourage group study among themselves for research purposes ( = 3.01). These findings corroborate the views of Brown &Adlier (2008) who noted that the use of Web 2.0 technologies encourage and enable teachers and learners to share ideas and collaborate ininnovative ways. The findings also lend credence to the assertion by Richardson (2009) that Web 2.0 has the potential to create more interactive and powerful learning environments in which learners become knowledge creators, producers, editors and evaluators.

On the other hand, the findings revealed low utilization of Web 2.0 by students to communicate with their supervisors for research purposes ( = 2.43); bridge the gap between lecturers and students for research purposes ( = 2.48); obtain data from respondents for research purposes ( = 2.40), and get research materials from online library ( = 2.46). These findings are in consonance with Lambert &Kidds (2008) who stated that while Web 2.0 has the potential for instructional uses, it is limited in scope, and that vast majority of educators still have little or no experience with these new tools. The test of hypothesis on the variable revealed a significant relationship between utilization of Web 2.0 and Vocational Education graduating students’ research. Therefore, the null hypothesis is rejected.

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On the the utilization of WhatsApp for research, the result presented in Table 2 revealed that only item 5 – request for research information from other students (= 3.56) is highly utilized; item 9 – communicate to students on issues that pertain to research (=2.63) is averagely utilized, while all other items in the cluster receive low utilization. Results in Table 2 showed that WhatsApp is mainly used by students on their group chat to communicate information. Whereas researches indicated that apart from creating a pleasant environment and in-depth acquaintance with fellow students, WhatsApp has academic advantages such as accessibility of learning materials, teachers availability and continuation of learning beyond class hours, and is rated the most downloaded application in 127 countries (Cohavi, 2013); with an average of 31 billion messages being sent everyday (Tzuk, 2013). Thus WhatsApp as one of the popular social media tools of digital communication could be used to communicate between groups of students and between students and teachers for research purposes.

However, analysis of data from the present study indicated low utilization of WhatsApp for research purposes by Vocational education graduating students. A cluster mean of 2.40 indicates that WhatsApp generally has low utilization for research by vocational education graduating students. From the analysis of the field data, the researchers found the utilization of WhatsApp for research has not been adequately explored.

Analysis of data presented in Table 3 on the utilization of YouTube for research indicated high utilization by vocational education graduating students as reveal in items 1, 2 and 9 with mean scores of 3.74, 3.80 and 3.55 respectively. These imply that the students watch educational videos for research purposes, learn guidelines on research without their supervisors, and enhance their final research presentation. The findings also revealed that vocational education graduating students averagely utilize YouTube to acquire relevant information for research (item 3, = 3.48); gain more understanding of research through videos (item 4,=3.48); and watch educational research platform from other institutions (item 5,  = 3.33). On the other hand items 6, 7, 8, 10 and 11 rated low utilization with mean responses of 2,47, 2.44, 2.47, 2.47 and 2.42 respectively. With a cluster mean of 2.92, the findings generally indicated average utilization of YouTube for research by vocational education graduating students.

These findings support the views of Kousha, Thelwall & Abdoll (2012) who pointed out that although online videos are increasingly used by academics for informal scholarly communication and teaching, the extent to which YouTube videos are used for in research is unknown. The findings also corroborate Laurier (2013) who observed a generally low level of YouTube use for research. The findings agree with Zhu (2017) who posited that very little attention has been paid to academics’ use of YouTube and video sharing services for research purposes. From the foregoing, it is obvious that the use of YouTube for research is still at its crawling stage.

On the use of Facebook for research, data presented in Table 4 revealed that items 1, 3 and 4 rated high utilization with mean scores of 4.24, 4.32 and 4.05 respectively. Items 2, 5 – 8, 11 and 15 rated low utilization with mean scores of 2.45, 2.31,2.28, 2.40, 2.15, 2.19, 2.29 and 2.00 respectively, while items 10, 12, 13 and 14 rated very low utilization with mean scores of 1.47, 1.49,1.42 and 1.48 respective. The cluster mean of 2.44 indicates a generally low level of utilization by vocational education graduating students.

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The findings lend credence to views that the use of Facebook is time-consuming (Ulusu, 2010); leads to procrastination and changing priorities (Vivian, 2011); waste of money spent on surfing and even addiction (Kuss& Griffiths, 2011). However, Lam (2012) believed that Facebook is not only a social network service, but its benefit can help motivate students learning if properly incorporated in learning. Obviously, Facebook can be positively used to promote collaboration, sense of community and communication between teachers and students.

**Summary of findings**

The following are the major findings of the study; thus:

1. The study revealed that there is a significant relationship between utilization of Web 2.0 and vocational education graduating students’ research.
2. The study shows that there is a significant relationship between utilization of WhatsApp and vocational education graduating students’ research.
3. The study revealed that there is significant relationship between utilization of Youtubeand vocational education graduating students’ research.
4. The study shows that there is a significant relationship between utilization of Facebook and vocational education graduating students’ research.

**Conclusion**

Based on the findings it is imperative for vocational education graduating students to use Web 2.0, Whatsapp, Youtube, and Facebook for research. These social media can be very effective in ensuring good research in vocational education and training delivery if adequately explored and positively utilized.

**Recommendations**

Based on the findings and conclusion made on this study, the following recommendations were made:

1. The national university commission (NUC) should ensure the inclusion of social media in the curriculum of all programmes in the university.
2. The university management should organize seminars from time to time in order to enlighten students on the need to used social media before graduating from the university.
3. The government should provide the enabling environment for students to
4. Utilize social media by reduce the cost of social media facilities.
5. Vocational education department of university of calabar should make the use of social media compulsory for students in the department.

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**THE EFFECTIVE METHODS OF BUSINESS STUDIES DELIVERY IN NIGERIAN SECONDARY SCHOOLS**

**BY**

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**Abstract**

*Business Studies is a prevocational subject taught in Nigeria secondary schools. Components of business studies include; office practice, Book-keeping, Commerce, Keyboarding, and Computer studies. Business studies prepare students, youths for vocations and also furnish them with relevant information concerning their lives both as citizens and as individuals. In the first instance, is develops certain skills, attitudes and abilities that are relevant to securing jobs in the business world.Business studies programs are carefully structured to provide the best all-round educational foundation for future business leaders, owners and managers. At the secondary school level, business studies is intended to enable students acquire basic knowledge of business studies, as well as help them develop basic skills in office occupation, for personal use and for further training in business studies. The paper focused on the effective methods of business studies delivery in Nigeria Secondary Schools. The Concept of business studies was discussed, the imperative of business studies in modern society and the status of Business Studies in today’s business world was discussed, theobjective of business studies was highlighted, best methods in business studies delivery were equally suggested and discussed. In addition, conclusion was drawn and recommendation was given.*

**Key words:** Effective, method, delivery and business studies*.*

**Introduction**

Business education which is offered in Nigerian universities, polytechnics, colleges of education, private commercial and secretarial colleges and as business studies in junior secondary schools in Nigeria. Phelps-Stolkes report of 1920 and the report of the Ashby Commission of 1960 encouraged the establishment of business education courses in higher institutions of learning in Nigeria. It also encouraged the introduction of technical subjects in secondary school curriculum. Business education which started in private secretarial/commercial schools is currently being offered in Universities, Polytechnics as well as secondary schools in Nigeria.

At the secondary school level, business studies is intended to enable students acquire basic knowledge of business studies, as well as help them develop basic skills in office occupation, for personal use and for further training in business studies. The paper focused on the effective methods of business studies delivery in Nigerian Secondary Schools. The Concept of business studies was discussed, the imperative of business studies in modern society and the status of Business Studies in today’s business world were discussed, the objective of business studies was highlighted, and best methods in business studies delivery were equally suggested and discussed.

**Concept of Business Education**

Business education is an aspect of vocational education, which equips individuals with the necessary skills, and theoretical knowledge needed for performance in the business world either for job occupations or for self-employment. Business education is education for business and about business. Vocational/business education is offered at both the formal and the non-formal setting. Formal education here refers to educational programmes offered at the secondary schools and higher institutions aimed at providing vocational skills to youths. On the other hand, non-formal vocational education refers to educational programmes offered outside the formal school system aimed at providing, developing and improving vocational skills and general knowledge for children and youths who dropped out of the formal school system for one reason or the other. The formal school system, as provided for by the Federal Government in its National Policy on Education (2013), offers business studies which comprises of shorthand, typewriting, commerce, office practice and book keeping. Business studies are a compulsory subject at the Junior Secondary School level in Nigeria. According to the JSCE syllabus, each of the components of business studies is taught as units and they are examined either in objective questions form or essay or both as the case may be.

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The national policy on education (2013) further provides that on completion of the junior secondary school, students should be streamed into senior secondary school, the technical college, vocational training Centre and the apprenticeship scheme on the basis of 60%, 20%, 10% and 10%. Education for business is obtained at the senior secondary level and it is the type of education that gives specific business knowledge. Vocational education at this level includes shorthand, typewriting, book-keeping, commerce etc which are taught as separate subjects with emphasis on practical training. This enables students to acquire skills either in accounting, secretarial or office administration/marketing respectively. One of the aims of secondary education is that secondary school leavers should be able to make a useful living for themselves within the society (NPE 2002). According to Fafunwa (1991), the purpose of education is functionalism. Vocational business education provides practical skills for occupational purposes. On completion of the senior secondary school, students seek admission into higher institutions to study courses that are of interest to them. Universities and Polytechnics in Nigeria offer a four year course in business education while colleges of education offering a 3-year course in business education.

According to Chukwurah (2011) Traditional methodssuch as lecturing method has been used in teaching business courses which is useful to make students understand the concept in direct logical manner but this method make students passive because of its one way nature of communication, learning is difficult to gauge, no participation of audience, takes more time and most importantly it’s not pragmatic method of teaching it can’t present realistic picture of a "real world" situations of business, there is need to think differently from lecturing methods of teaching to make students understand intricacies of business from a practical angle, this is where non lecturing methods are handy ignorance to knowledge, from inability to competence, and from indifference to understanding. For proper learning students require suitable teaching methodology where there is chance for the students to acquire knowledge or skill and apply this to face the problems and challenges of real world situations. The main difference between learning and memorization is "Learning” is how you acquire new information about the world, and memorization is how you store that information over time. The objective of any teaching method should be to harness learning not memorization.

**The importance of business studies in modern society**

Business activity affects the daily lives of all people, as they work, spend, save, invest, travel, and play. Business inﬂuences jobs, incomes, and opportunities for personal enterprise and development. Business has a signiﬁcant effect not only on the standard of living and quality of life, but also on the environment in which people live. At some point in their lives, all students will encounter the world of business. They, therefore, must be prepared to engage in business activity with conﬁdence and competence, by understanding how businesses function and the role it plays in our society. Students should familiarize themselves with the skills that are required in the business environment and the impact these skills can have on their own lives and on society. Studying business not only involves studying individuals, communities, and organizations, but involves assessing their needs and problems, as well as generating solutions. This subject will build a strong foundation for those students who wish to move on to further study and training in specialized areas such as management, international business, marketing, accounting, information and communication technology, or entrepreneurship. It will also provide practical skills for those who wish to move directly into the workplace.Ogwu and Oranu (2006) opinedthat business studies provides students with a new, practical context for many of the subjects they have studied, including mathematics, science and technology, language, and social studies. It will help students to recognize the relevance of these subjects as they are applied in the world of business – for example, in helping people with their needs, challenges, and problems; and in creating products and services that help to improve the quality of life.

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Business studies demonstrate how a variety of areas of study can be combined in productive activity. It provides an increased understanding of mutual dependence through business system, as people becoming increasingly dependent on others. Finally, as the business environment is dynamic and ever-changing, it can be an important tool to develop skills to cope with change.

Notably, Ikpe (2014) suggested the importance of business studies includes but not limited to:

1. It provide opportunity for making appropriate career selection
2. The knowledge of business studies help consumers to make better decisions about daily needs.
3. It help to develop individual ability to calculate
4. It helps to provide opportunity for self-development
5. Business studies helps individual to make better investment decision

**The status of business studies in today business world**

Interestedly, Osuala (2004) emphasized the need of Business studies as so imperative and valuable to students at all stages of life, including young adults at the very start of their careers and older adults who own established businesses. By allowing customization of coursework and study, colleges and universities make it easier for students with different needs and circumstances to get the information and training they most need when they need it. Today’s business climate is globalized and more diverse than ever before. At the same time, technology has radically shifted the details of how business is conducted. As a result, specialization is increasingly important and business studies programs have responded to this shifting reality.

Again, Adesna and Ogunsalu (2014) agreed that modern business studies programs generally allow students some degree of specialization. Students no longer are restricted solely to a broad and general selection of overview courses. They can concentrate in a specific area and learn it in more depth. This focused approach permits students to achieve a deeper level of expertise, thus preparing them more efficiently for their specific career goals. If you’re already an entrepreneur or small business owner, business studies can still be a valuable investment for you. Many local and community colleges offer part-time programs featuring business studies, both at the undergraduate and postgraduate levels. You can enroll in a few courses per semester and enjoy positive benefits for your personal career and your business as a whole.In addition, many well-known larger institutions offer business study courses online in a virtual classroom. These course offerings may be designed to lead to a degree or certification, or they may simply be for enrichment or continuing education purposes. Even without the benefit of a formal degree program, however, business students can take what they’ve learned and transfer those skills to their real-world contexts. Improved skills in accounting, marketing, product development and personnel management, to name but a few, can have an immediate benefit for any small business.

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**Objectives of Business Studies**

At the secondary school level, business studies is intended to enable students acquire basic knowledge of business studies, as well as help them develop basic skills in office occupation and for personal use. It is also expected to prepare them for further training in business studies. As for those who intend to work immediately, it is also expected to provide them with the orientation and basic skills with which to start a life of work.

However, Adesna and Ogunsalu (2014) noted the objectives of business studies as stated in the JSCE syllabus include enabling the students to:-

1. Appreciate the role of commerce and its relationship with the other aspects of production
2. Appreciate and understand the basic concepts and principles relating to commercial activities with practical situations, especially, in a developing economy.
3. Identify types of transactions and open the necessary books of accounts they pass through in the modern business activities.
4. Acquire the ability in office procedure or practices
5. Acquire skill in typing mailable letter at a determinable speed/time as well as knowledge of the ethics of an office/organization
6. Acquire skill in writing correct shorthand outlines by its theories and transcription of simple shorthand passage(s) into long hand with correct spellings at a determined speed and time
7. Prepare for further work in commerce, book-keeping, office practice/procedure, typing and shorthand.Business skills acquired at the secondary school level enable individuals to make useful living for them as well as prepare students for higher education.

**Best practical approaches in delivery business studies courses in Nigeria secondary schools**

To produce creative business students across secondary school in Nigeria, we can adopt following practical methods in teaching business studies courses to enrich and enhance learning experience to our students as opinioned by (Mohammad, 2015).

Case study, role play, simulation and business games, research based individual/group projects, peer tutoring, learning in communities(team learning), hands on learning and internships, class room group discussions and brainstorming, industry visits, dummy money, films and audio visual methods teaching with digital edge, problem based learning (PBL), quiz, workshops and conferences, short written exercise, mind map.

**Case study**: This is one of the oldest practices in teaching business studies where all the students learn the practical business situations from the various business case studies of all the global companies.Business school on an average 3000 cases are being discussed and analyzed in the classroom. This gives the clear knowledge about the Business tactics needed when the student goes to the field. The cases will likely be assigned ahead of time to allow the students a chance to read through the materials and be prepared with their analyses for the class discussion. The teacher will then lead the class discussion and encourage debate between the students.

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**Role-play:** This is one of the modern techniques used to inculcate the real Internalization of the character and situation. Stepping into one's shoes and acting like that will not come easily. But, this role-play method triggers you to act as such in the situation and like the person. The sales training skills are taught in that manner. For example asking student to act as salesman and sell product to another student who act as customer.

**Simulations and Business Games:** Student motivation can increase with the use of games to reinforce skills and concepts learned. Games are always fun and exciting for all irrespective of age. The students will learn the concept and theory by funny way. The teacher has to complete by linking the purpose of the game and the concept derived out of it. The involvement from the participants is cent per cent. The games may be played indoor and outdoor. Varieties of games are available from ice breaking to risk taking. Games can be designed to teach facts, skills, processes and behaviors as well as problem solving, reasoning and creativity. They can come in the form of single player or multiplayer games, involving complex role-play or simulation. For example: Giving 100 rails to student group as capital to start any business and asking them to make profits by using his entrepreneurial skills.

**Research based individual/group based projects:** Project-based learning activities create opportunities for students to work on problems in the real world. Accomplished teachers make the projects relevant to the world outside the classroom, and help the students to see and understand the connections between classroom activities and the world of work. These projects can also build students‟ abilities to set personal goals and standards of excellence. The interdisciplinary nature of these projects encourages students to widen and explore their personal interests while gaining the knowledge they need in core subjects.Projects can be individual and group based. Before student embarks on projects he must be given training in Questionnaire Designing, Sample Survey, Data Analysis and Report Writing.

**Peer tutoring:** Peer tutoring is the process by which a student with guidance from a teacher helps one or more students at the same grade level learn a skill or concept. Through this method the students will learn team skills, public relations.

**Learning in communities (Team learning):** Learning in communities (Team learning) Learning with peers, either through collaboration in a group project or through discussion in small-groups provides variety to students' learning experience. Students can improve Social and motivational skills, and they get exposed to Critical thinking, Team-working and problem solving skills.

1. When a teacher initially puts students into a group, the students are a "group," not a "team."
2. As the students begin to trust each other and develop a commitment to the goals and welfare of the group, they become a team.
3. When they become a cohesive team, the team can do things that neither a single individual nor a newly-formed group can do.

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1. Team-based learning starts with groups and then creates the conditions that enable them to become teams Team assignments both builds team cohesiveness and rewards students for taking responsibility for their own pre-class preparation.

**Hands-on learning:** Hands-on learning provides learning by doing-- helping a student to acquire knowledge and skills outside of books and lectures. Learning can occur through work in organizational projects or performing organizational duties practically. Ex: On the Job Training (OJT), Internships. An internship is a work-related learning experience for individuals who wish to develop hands on work experience in a certain occupational field. Most internship is temporary assignments that last approximately three months up to a year.

**Classroom group discussions and Brainstorming:** Classroom discussion can be a very powerful tool for student and teacher learning. But teachers need to plan discussions carefully to be sure that goals are met and students interact effectively. Good discussions start with advance planning. Students know the ground rules for participation and respect each other contributions. Teachers guide students from comprehension and review questions to complex and critical thinking. They keep records of the discussion so that all participants can return to the topics. And, accomplished teachers allow for “wait time” so that students have time to formulate their answers. Brainstorming is a group creativity technique that was designed to generate a large number of ideas for the solution of a problem. Brainstorming is most effective with groups of 8-12 people and should be performed in a relaxed environment. If participants feel free to relax and joke around, they'll stretch their minds further and therefore produce more creative ideas example student should be asked to launch a product and brainstorming session must be conducted to know advertising and sales promotion techniques can be used effectively. Another form of class room discussion is debate - formal debates provide an efficient structure for class presentations when the subject matter easily divides into opposing views. Students are assigned to debate teams, given a position to defend, and then asked to present arguments in support of their position on the presentation day.

**Industry visits:** Students can be taken to nearby companies to make them understand how the company operates, which will give them real world experience

**Problem based learning:** How can I get my students to think? is a question asked by many faculties, regardless of their disciplines. Problem-based learning (PBL) is an instructional method that challenges students to "learn to learn," working cooperatively in groups to seek solutions to real world problems. These problems are used to engage students' curiosity and initiate learning the subject matter. PBL prepares students to think critically and analytically, and to find and use appropriate learning resources. Problem-based learning (PBL) is a pedagogical strategy of "active learning" often used in higher education, the defining characteristics of PBL are:

1. Learning is driven by challenging, open-ended problems.
2. Students work in small collaborative groups.
3. Teachers take on the role as "facilitators" of learning.

Accordingly, students are encouraged to take responsibility for their group and organize and direct the learning process with support from a tutor or instructor. Advocates of PBL claim it can be used to enhance content knowledge and foster the development of communication, problem solving, and self-directed learning skill.

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**Business Quiz:** Quiz is one of the techniques used to test the student's involvement and excitement in winning prizes. Usually 2-4 members are made as a group and ask oral questions as a group, this technique help students to improve group behavior, leadership skills, communication skills and decision making skills. After completion of some units of theory, a quiz is conducted. Students can s also takes part as quiz masters for marking scores and monitoring times. Question-Answers and Definitions, Jumbled-Words and Multiple-Choice Questions (MCQs), Graphs and Flow Diagrams (indicate the missing link), Match the Columns, Clinical Problems, and Rapid-Fire Round.

**Dummy money:** To Measure entrepreneurial and risk taking abilities of the student’s dummy currencies are given to them. They invest as real money in new ventures, stocks, commodities and the like; at the end of the game the real risk taking ability of the participant is measured. In some Institutions real money is also given by getting sponsor from corporate.

**Student seminars and workshops**: Monthly seminars and workshops on various business subjects are must and all the students are required to participate actively. The best speaker of the seminar from the entire batch is given an award and weight age marks. The awards are given to inculcate a competitive spirit in the students and bring the best out of the students. These seminars and workshops can also be conducted by corporate experts of different subjects.

**Films and audio visual methods teaching with digital edge:** Opening Classroom Doors to techno based teaching with Digital Edge is the order of the day to bring real effects in teaching, Films and audio tutorial make students understand better and it inculcate self-learning.

**Short written exercise:** A short written exercise that is often used is the "one minute paper." In this exercise students are asked to summarize the day's discussion in a short paper to be turned in before the end of class. This is a good way to review materials. Teaching methods are effective when teacher adopts inspirational approach to the art of teaching. This is covered in next section of this article.

**Brain Map:** It’s a graphical way to arrange a topic into a piece of paper, which is used to generate, visualize, structure and classify ideas. Visually it looks very much like a styled “spider-diagram”, but contains more thought.

Chukwurah (2014) enumerated the following best ways of business studies delivery in Nigeria secondary schools as follows: Power point presentation, audiovisual aids, written exercise, Project method, question method, dattonor assignment method, and Socratic Method.

**Conclusion**

Business studies as a subject is very valuable to secondary school students. This is because it exposes students to the world of commerce and industry and enables them to appreciate modern business activities. Business studies which comprises of typing, shorthand, office practice, commerce and book-keeping is a compulsory subject at the junior secondary school level. Its objective is to enable students appreciate the five components and how they relate to each other. Students’ knowledge and understanding of the role of commerce in the economy of the nation; of the basic concepts and principles relating to practical commercial activities; acquisition of office and book-keeping skills (aural, mental and manual) help to prepare students for the business world.Various teaching methodologies can enhance the skills of students and enable them to master the subject area. In the current era, all of the decisions are driven with the help of principles of business. There is a need for every individual to understand business and have knowledge about the enterprise activities. Therefore, it is the responsibility of teachers to apply the effective methods of teaching business studies to prepare the students for the world of work requirements.

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**Recommendations**

For the effective delivery of business studies in Nigeria secondary schools the following recommendations were given.

1. Business studies should be taught by teachers that are expert in business education field to maximize appropriate methods.
2. Adequate equipment should be provided to schools that offer business studies to enable the student better.
3. Enough time should be given to business studies teachers in the time table to enable them explain the contents elaborately.
4. Teachers whoteach business studies should always endeavor to deliver what is required to be taught to each level of students.

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**BEST PRACTICES FOR IMPROVING THE TEACHING OF VOCATIONAL EDUCATION COURSES IN TERTIARY INSTITUTIONS FOR NATIONAL DEVELOPMENT**

**BY**

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**Abstract**

*This paper took a critical look at the best practices for improving the teaching of vocational agricultural and business education courses in tertiary institutions for national development. The study adopted survey research design. The population was 48. This comprised 20 male and 25 female lecturers. Three research questions and three hypotheses guided the study. A 48-item-questionnaire was used to elicit responses from the respondents. The questionnaire was validated by three experts. The reliabilityof the instrument was determined by using Cronbach Alpha which yielded a reliability coefficient of 0.82. Out of the 48 questionnaire copies distributed, 45 copies were completed and returned. representing 93.75% return. The data collected were answered using mean with standard deviation while the t-test was used to test the hypotheses. Based on the analysis of the data, it was found that the use of appropriate instructional materials, will improve the teaching of vocational agricultural and business education courses at the tertiary institution for national development. Also, it was found that appropriate teaching methods like demonstration and field trip among others help in improving the teaching of vocational agricultural and business education courses. Equally, it was found that the use of appropriate physical infrastructures can help to improve the teaching of vocational agricultural and business education courses in tertiary institutions. Based on the findings, the researchers recommended among others that the teaching of vocational agricultural and business education courses in higher institutions should be practical- oriented using the appropriate instructional materials, teaching methods and physical infrastructures.*

**Key** words: Teaching, Vocational, Agricultural, Home Economics, Business, Education and National Development

Introduction

The importance of vocational courses in the society today is one that cannot be looked down as every daily activity of man revolves under achieving food security and successful business for improved livelihood for national development. Vocational education is an education process which is designed to help individual acquire skills, ideas, knowledge and the ability in vocational areas (Olabode, 2011). As a nation, vocational education is very important. This is because, the training and retraining of individuals to acquire the necessary skills to be able to stand the test of time has continuously left the entire management of different sectors of the economy to spend time on what and how to push the economy forward and at the same time reduce over dependent on oil (petroleum) sector. This however, cannot be achieved if adequate attention is not given to the method of teaching and learning of vocational courses in the tertiary institutions. Adequate teaching method guarantees proper learning and improved standard of living.

The standard of living in.; the present day economy depends greatly on the level of teaching and learning of vocational courses like Agricultural education, Business education as well as Home economic education. Agricultural education is the process of acquiring skills, knowledge and attitude by individuals for improved rearing of animals, cultivation of crops and trees for human use (lkegwukni, 2015). Ojeme (2015) noted that Agricultural Education is that aspect of education that is meant to train people for efficient, profitable and satisfying employment in different field of agriculture and in addition equip them with the necessary skills needed for teaching and learning. Apart from the development of skills and competencies in agricultural production in the learners, agricultural education develops values, attributes, citizenship and cooperation needed in the agricultural production (Ndem, 2017). The target of agricultural education at the tertiary institutions include to produce graduates who can teach agricultural science and agricultural related courses at the secondary schools and in tertiary institutions in Nigeria, plan, implement and evaluate agricultural education programmes, plan, develop, implement and evaluate agricultural extension and rural development programmes, manage educational and agricultural organizations, conduct and design research in agricultural education and agricultural extensions, develop and conduct training in agricultural education and agricultural extension, Pursue further training in agriculture, Agricultural education, agricultural extension and related discipline.

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By doing these, Agricultural Education performs important role in the Nigeria educational sector by providing learners with the personal academic and career experience and competences needed for participation in food-security and sustainability as well as in entrepreneurship education.

On the part of business education, Igboke (2005) explained that business education is that aspect of vocational education programme that provides knowledge, skill, understanding and attitude needed to perform in the business world as a producer or consumer of goods and services that business offers. Supporting his view, Eze and Emeh in Akarahu (2011) noted that the objectives of business education include among others, to provide students with enough training that will make them to be creative and innovative after graduation from the university. Vocational business education is one of the vocational education courses which prepare individuals with vocational skills for business management. Home economic Education is one of the vocational courses. Home economic according to Anyakoha (2018) is the vocational course that prepares students on the skills and competencies in home management clothing and textile, family health and community development. FRN (2014) referred vocational education as that aspect of education which leads to the acquisition of practical and applied skills and basic scientific knowledge. According to Ifeagwu (2000), vocational education is a productive education which helps the recipients to acquire appropriate knowledge and skills for satisfaction of the urgent need for employment particularly by self. Tibi cited in Moustafa (2010) noted that areas of vocational education include Agricultural Education, Business and office education, fine and applied Arts education, Home Economics Education as well as Health Occupation Education. Uko, Ariomoh and Salami (2007) equally added that vocational subjects are taught to inculcate certain knowledge and skills that will prepare students for stereotype job placemen' in such areas like hospitality and tourism, catering, craft practice, textile trades, horticulture, aqua-culture, farming, printing trades, beauty culture, leather works, shoe making and repairs, soap production, pomade and palm oil processing. Through these skills acquired, young people and adults do not only earn a living but also become employers of labour. This can be achievable through effective teaching of agricultural and business education in tertiary institutions for national development. National development, in the context of this study is conceptualized as a developmental process that can endure the test of time (Ndem, 2017). It also involves all aspects of progress in the nation which include; political, economic and social. This can be achieved if the best practices are adopted in the instruction of the vocational agricultural and business education courses at the tertiary institutions. Best practices are those appropriate teaching that can be adopted to carry out any operation skillfully and profitably.

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In classroom situation, it is a techniques adopted by the teacher, his activities, his behaviour and actions taken for effective teaching of his students. Depending on the subject matter and teacher, best practices connotes the use of the appropriate teaching aids in teaching, use of conducive environment, as well as the manner of presentation which the teacher adopts. Best practices also involve arrangement of classroom and grouping students, guiding activities and providing information that will aid learning. Nwachukwu (2011) equally noted that best practices include adopting the best decisions about organizing students materials and ideas to provide learning. The technique adopted by teacher in teaching depends on many factors such as class size, age of the learner, subject matter, teaching aid available, previous know ledge of the learner, competency of the teacher and others. The teaching of vocational agricultural, Home economic and business education courses require the best techniques in order to achieve the objectives of the courses. The teaching of agricultural and business education at the higher institutions as observed in Ebonyi state is not carried out using the best practices. Teaching is much more than presentation of information or idea but rather involves guiding students to learn by means of discerning, probing, examining and analyzing activities: Experience has demonstrated that most teachers at the high institution' teach vocational agricultural, Home economic and business education courses using the conventional method of teaching such as lecture method which does not suit vocational courses. Vocational courses should be taught with practical demonstration and project methods. The teaching of vocational agricultural business education and Home economics courses using traditional methods has made the students not to acquire the basic skills.

Statement of the problem

Practical observation has shown that the chunk of agricultural, Home economics and business education graduates being produced by higher institutions of Nigeria are neither employable nor self employed. This might have been attributed to many factors such as, poor teaching of vocational agricultural, Home economics and business education courses in the institutions of higher learning using lecture methods.

Akpan, (2006) lamented that the teaching of Business, Agricultural and Home economics Education as vocational course in tertiary institutions have failed to produce students who can demonstrate credibly in the current place of work and cannot produce students with needed skills tor employment or self reliance. Umezurike (2007) pointed out that when graduates are properly prepared in vocational courses, they will generate employment, overcome poverty and become useful members of the society.

Ezemoyih (2011) equally noted that the cause of production of unskilled graduates in vocational courses is the adoption of inappropriate techniques. Since vocational courses are aimed at improving personal skill of the students and building dependability of the graduates, its teaching is expected to be dynamic, practical-oriented, and activity based. This can only be achieved through the application of best practices, putting into consideration the physical, emotional, psychological and philosophical disposition of the recipients. It is therefore on this background that this work is designed to determine the best practices for improving the teaching of vocational education courses at the tertiary institutions.

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**Purpose of the Study**

The main purpose of the study was to determine the best practices for improving the teaching of vocational education courses at the tertiary institutions for national development. Specifically, the study sought to;

1. Determine the appropriate instructional materials as the best practice for improving the teaching of vocational business, Home economics and agricultural education courses for national development.
2. Determine the appropriate teaching method as the best practice for improving the teaching of vocational business, Home economics and agricultural education courses for national development.
3. Determine the appropriate physical infrastructure as the best practice for improving the teaching of vocational business, Home economics and agricultural education courses for national development

**Research -Questions**

The following research question guided the study;

1. What are the appropriate instructional materials as the best practice for improving the teaching of vocational agricultural, home economic and business education courses for national development?
2. What are the appropriate teaching methods as the best practice for improving the teaching of vocational business, home economics and agricultural education courses for national development?
3. What are the appropriate physical infrastructure as the best practice for improving the teaching of vocational business, home economics and agricultural education courses for national development?

**Research Hypotheses**

The following hypotheses were tested at 0.05 level of significance.

**Hoi:** There is no significant difference in the mean responses of male and female lecturers on the appropriate instructional materials as the best practice that will help to improve the teaching of business, home economics and Agricultural education courses for national development.

**Ho2:** There is no significant difference in the mean responses of male and female lecturers on the appropriate teaching methods as the best practice that will improve the teaching of business, home economics and Agricultural education courses for national developments.

**Ho**3: There is no significant difference in the mean responses of male and female lectures on the appropriate physical infrastructures as the best practice that will help to improve the teaching of business, home economics and Agricultural education courses for national development.

**Methodology**

The study used descriptive survey design. The area of the study was Ebonyi State comprising three tertiary institutions offering business and agricultural education namely: Ebonyi State University Abakaliki, Ebonyi State College of Education Ikwo and Federal University, Ndufu-Alike Ikwo. The population of the study consisted of (48) lecturers in the three tertiary institutions in Ebonyi State. The instrument for data collection was a structured questionnaire containing (48) items. A four-point response scale was" used in the instrument-Strongly Agreed (SA: 4points), Agreed (A: 3 points), Disagreed (D: 2points) and Strongly Disagreed (SD: 1 point). The instrument was subjected to face validation by two experts in Ebonyi State University in Business Education Department and two experts in Agricultural Education Department as well as one expert from Measurement and Evaluation all from Ebonyi State University Abakaliki. The reliability of the instrument was determined by using Conbach Alpha which yielded the reliability co-efficient of 0.82. The data were collected by the researchers by distributing the entire 48 questionnaire and 45 were returned representing 93.75% return. Mean and standard deviation were used to analyze data collected for the research questions while t-test was used'to test the hypotheses formulated for the study. In answering the research questions, 2.50 wasused as a bench mark. Any mean score of 2.50 and above was regarded as the bestpractice that will help to improve the teaching of vocational agricultural and business education while on the other hand, anymean score below 2.50 was, regarded as a practice that does not help to improve the teaching of vocational agricultural and business education in tertiary institutions. In testing the hypotheses, the t-calculated was compared with the t-table. Where the t-cal value was less than the t-critical value, the null hypotheses was accepted, where the t- calculated value was higher than the t-critical value, the null hypotheses were not accepted.

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**Results**

Research Question I: What are the Appropriate Instructional Materials as the best practice forImproving the Teaching of Vocational Education courses for national Development?

**Table:** Mean and standard deviation scoreof respondents on the appropriate instructional materials for improving the teaching of vocational education courses for national development

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Items (Agricultural Education Instructional Materials)** | **X** | **SD** | **Decision** |
| 1 | Soil sample | 3.00 | 0-67 | Agree |
| 2 | Farm tools (cutlass, hoe, spade) | 3.13 | 0.58 | Agree |
| 3 | Farm machines (Tractors) | 3.00 | 0.60 | Agree |
| 4 | Agro-chemicals (Herbicides) | 3.02 | 0.69 | Agree |
| 5 | Samples of crops (Maize seed) | 3.00 | 0.56 | Agree |
| 6 | Samples of animals plants (skin, hides) | 3.06 | 0.57 | Agree |
| 7 | Fertilizers (different types NPK, urea) | 3.00 | 0.63 | Agree |
| 8 | Animal feeds (poultry feeds) | 3.00 | 0.60 | Agree |
| 9 | Fishing tools (Hook, line, basket) | 2.95 | 0.67 | Agree |
| 10 | Pictures | 1.93 | 0.83 | Disagree |
| 11 | White board | 3.08 | 0.63 | Agree |
| 12 | Charts | 3.06 | 0.61 | Agree |
| 13 | Magnetic boards | 3.06 | 0.63 | Agree |
| 14 | Flannel graph | 2.97 | 0.65 | Agree |
| 15 | Rock-samples | 2.97 | 0.65 | Agree |
| **Business Education Instructional Materials** | | | | |
| 16 | Type writing machine | 3.04 | 0.63 | Agree |
| 17 | Computer machines | 3.08 | 0.63 | Agree |
| 18 | Scanners | 3.11 | 0.57 | Agree |
| 19 | Stapling machines | 3.04 | 0.63 | Agree |
| 20  ***Ndem, Olayinka, Onoh & Akubue*** | Typing ribbons | 3.06 | 0.61 | Agree |
| 21 | Correction fluid | 3.04 | 0.47 | Agree |
| 22 | Check books | 2.88 | 0.68 | Agree |
| 23 | Invoice booklets | 2.91 | 0.73 | Agree |
| 24 | Sales day book | 2.88 | 0.71 | Agree |
| 25 | Purchases day books | 2.97 | 0.69 | Agree |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 26 | Photocopying machines | 3.02 | 0.65 | Agree |
|  | **Home economic education instructional materials** |  |  |  |
| **27** | Sewing machine | 3.06 | 0.61 | Agree |
| **28** | Measuring tape | 3.26 | 0.55 | Agree |
| **29** | Scissors | 2.67 | 0.82 | Agree |
| **30** | Cooking pot | 3.68 | 0.71 | Agree |
| **31** | Gas cylinder | 2.94 | 0.63 | Agree |

The result of the study in Table 1 shows that except item (No) 10 with a mean score of 1.93, every other item in the Table were agreed by the respondents as the appropriate instructional materials for improving the teaching of vocational educational courses for national development. They scored a mean point above 2.50 which is the cut-off point for acceptance. The standard deviation ranged between 0.56 and 0.83, showing that the opinions of the respondents did not differ so far.

**Research Question 2:** What are the appropriate teaching methods as the best practice for improving the teaching of vocational Education courses for national development?

**Table 2:** Mean and standard deviation scores of respondent’s views on the appropriate teaching methods for improving the teaching of vocational education courses for national development.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Statement** | **Mean (x)** | **Stand Deviation (SD)** | **Decision** |
| 1 | Lecture method | 2.22 | 0.92 | Disagreed |
| 2 | Constructive method | 3.0 | 0.63 | Agreed |
| 3 | Activity or drill method | 3.06 | 0.65 | Agreed |
| 4 | Cooperative method | 3.06 | 0.61 | Agreed |
| 5 | Role play method | 2.93 | 0.80 | Agreed |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 6 | Demonstration method | 3.35 | 0.64 | Agreed |
| 7 | Field trip method | 3.42 | 0.75 | Agreed |
| 8 | Socratic method | 2.97 | 0.69 | Agreed |
| 9 | Project method | 3.04 | 0.63 | Agreed |
| 10 | Story method | 2.28 | 0.86 | Disagreed |
| 11 | Individual method | 3.04 | 0.63 | Agreed |
| 12 | Discussion method | 3.04 | 0.63 | Agreed |
| 13 | Problem solving method | 3.15 | 0.52 | Agreed |
| 14 | Questioning method | 3.02 | 0.65 | Agreed |

The result of the study in Table 2 shows that apart from items (No) 1 and 10 with a mean score of 2.25 and 2.28 respectively, every other item in the Table was agreed upon by the respondents as the appropriate teaching methods for improving the teaching of vocational education courses for national development They scored a mean point above 2.50which is the cut-off point for acceptance. The standard deviation ranged between 0.56 and 0.83.showing that the opinions of the respondents did not differ so far.

Research Question 3: What are the appropriate Physical Infrastructures as the best practice for improving the teaching of vocational education courses for national development?

**Table 3:** Mean and standard deviation scores of respondents on the appropriate physical

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infrastructure for improving the teaching of vocational education courses for national development?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Statement | Mean (X) | Stand. Deviation (SD) | Decision |
| 1. | Computer laboratory | 3.08 | 0.63 |  |
| 2. | Typing pool | 2.97 | 0.62 | Agreed |
| 3. | Classrooms/lecture halls | 2.93 | 0.65 | Agreed |
| 4. | Modern staff room offices | 2.91 | 0.73 | Agreed |
| 5. | Workshops | 3.13 | 0.54 | Agreed |
| 6. | ICT centers | 2.93 | 0.65 | Agreed |
| 7. | Well equipped laboratories | 3.0 | 0.63 | Agreed |
| 8. | Demonstration forms | 3.13 | 0.54 | Agreed |
| 9. | Agric. Laboratory |  |  |  |
| 10 | School farm |  |  |  |

The result of the study in Table 3 shows that all the items in the above Table were agreed by the respondents as the appropriate physical infrastructures for improving the teaching of vocational education courses for national development. They scored a mean point above 2.50 which is the cut-off point for acceptance. The standard deviation ranged between0.56 and 0.83, showing that the opinions of the respondents did not differ so far.

**Table 4:** Summary of t-test analysis on the use of appropriate instructional materials as the best practice for improving the teaching of vocational Education course for national development

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Respondents | Mean | SD | N | Df | t-cal | t-tab | Decision |
| Male | 3.25 | 0.63 | 20 |  |  |  |  |
| Female | 3.68 | 0.67 | 25 | 43 | 0.82 | 1.96 | NS |

Table 4 revealed that the t-calculated value is less than the t-critical of 1.96 at the degree of freedom of 43. Therefore, the null hypotheses was retained.

Table 5: Summary of t-test analysis on the use of appropriate teaching methods as the best practice for improving the teaching of vocational education courses for national development.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Respondents | Mean | SD | N | Df | t-cal | t-tab | Decision |
| Male | 3.42 | 0.69 | 20 |  |  |  |  |
| Female | 3.08 | 0.63 | 25 | 43 | 0.83 | 1.96 | NS |

The Table 5 shows that the t-cal was les than the t-table at 0.05 level of significant at the 43 degree of freedom so the null-hypothesis was accepted and the alternative rejected

Table 6: Summary of t-test analysis on the use of appropriate teaching methods as the best practice for improving the teaching of vocational education courses for national development.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Respondents | Mean | SD | N | Df | t-cal | t-tab | Decision |
| Male | 3.08 | 0.67 | 20 |  |  |  |  |
| Female | 3.13 | 0.60 | 25 | 43 | 0.82 | 1.96 | NS |

Table 6 revealed that the t-calculated value is less than the t-critical of 1.96 at the degree of freedom of 43. Therefore, the null hypotheses were retained.

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Discussion

The result of the study 'showed that the use of appropriate instructional materials will help to improve the teaching of business, home economics and agricultural education as vocational course. This finding is in line with that of Finbel (2012) who noted that instructional materials generally embrace the various methods of disseminating teaching information. This method includes the use of sophisticated communication gadgets, books and teachers in face-to-face situations, different types of projected and non-projected aids. Also it equally revealed that the use of appropriate teaching methods will improve the teaching of business, home economics and agricultural education as vocational courses for national development. Appropriate teaching method will go a long way in improving the teaching of business, home economics and agricultural education as vocational courses for sustainable development. This finding is in line with Oduma (2013) who noted that all teaching methods use by the teacher must involve the participation of the teacher and the students. It means that the proper teaching method which must be adopted by the teacher should be the one with its focus on the learner. If teaching must be made learner centered, it means that active participation of the learners. He further explained that the appropriate teaching method for vocational education courese should include demonstration method, fieldtrip method discussion method and others. The study equally revealed that appropriate physical infrastructures help to improve the teaching of vocational education courses for national development.

This finding is supported by of Enyekit and Eykit, (2015) who noted that the appropriate use of physical infrastructure and facilities aids effective teaching of vocational agricultural, home economics and business education courses. To ensure proper teaching under a healthy condition, vocational education Departments which business and agricultural education fall under need to be adequately and sufficiently provided with request physical infrastructure.

Conclusion

Basically, there is the need for adoption of the appropriate strategy for improving the teaching of vocational education courses in tertiary institutions. This is because if tertiary institutions must produce graduates with the required skills, provision of the necessary materials ranging from instructional materials, teaching methods and physical infrastructures should not be taken for granted.

This study revealed that the adoption of the appropriate instructional materials, appropriate teaching methods and appropriate physical infrastructures will help to improve the teaching of vocational education courses in the tertiary institutions. It therefore becomes pertinent that teachers should always use the appropriate instructional materials and appropriate teaching methods in their lesson delivery and that proprietors of higher institutions should always provide the appropriate physical infrastructures for teaching of vocational agricultural, home economics and business education courses which have been assumed by the findings of this work as the best practices for improving the teaching of vocational agricultural and business education in the tertiary institutions.

Recommendations

Based on the findings of this work, the researchers recommend that;

1. Teaching of vocational courses should not be in isolation to appropriate instructional materials. Lecturers should therefore always use the appropriate instructional materials that suits vocational education courses in their teaching
2. Lecturers should adopt the appropriate methods which are practical oriented that will help the students participate fully in the learning activities such as demonstration method, field trip method and many others.

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1. The proprietors of the tertiary institutions in Ebonyi state should endeavor to provide the needed physical infrastructural facilities that will make teaching more conducive. This will not only motivate the lecturers' willingness to work but will also increase learners interest in the vocational education courses and other related area.

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**ROLE OF FINE AND APPLIED ARTS AS A PEDAGOGICAL TOOL IN EDUCATIONAL INSTRUCTION FOR DEVELOPMENT IN NIGERIA.**

**BY**

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**Abstract**

*This paper extols the invaluableness of education in the overall growth and sustenance of development in any nation. It therefore evaluates the concept of repositioning our educational system through innovations in educational policies, taking cognisances of the impact of educational media and technology in a bid to enhance and promote efficiency and effectiveness of the teaching-learning exercise. It thus, appraises the relevance of the study of Fine and applied arts as a skill for sustainable development valuing impute of fine and applied arts as a vocational and technical education program in grooming learners as professional into various enterprise geared towards the attainment of national goals and objectives. Conclucively, this paper raised recommendations on ways to further grow the Nigerian educational system especially in Technical and Vocational Skills Acquisition.*

**Keywords**: Invaluableness, Innovations, Sustainable Development, Skills Acquisition.

**Introduction**

Education helps to develop a pool of trained manpower capable of governing well and managing the wind of innovation, development and attainment of economic sufficiency of any nation. A nation like Nigeria has arguably the highest policy formulation and analytic capacity on the African continent. In sum, the country has the potential to build a prosperous economy, reduce poverty significantly, and provide the basic social and economic services its population needs. It regularly features as a leading performer in the West African region and indeed in the African continent, particularly in the cultural, economic, social and financial arena. With a population of over 180 million, the largest in Africa, Nigeria ought to be one of the four largest economies in Africa. Unfortunately, Nigeria is yet to galvanize its potential profitably. This may not be unconnected to its over 30 years of poor governance, erratic and distorted policies, public sector dominance in production and consumption as well as unbridled import corruption and unmitigated rent seeking behaviour to amass wealth from the oil and gas sector, among others. According to Sanusi (1992), Nigeria is in sorry state today flanked by high incidences of poverty, unabated increase in unemployment rates, poor/collapsed infrastructure and social amenities, wrong value and poor attitudinal practices, widespread insecurity, food shortage, increased hardship and uncertainty of the future as a country. Unfortunately, so much of her ambitions are largely unrealized because any nation whose priority is not set on human capital development through educational innovations is heading on a collision course. Do not wonder why there is increased call for restructuring of the Nigerian system as a desperate measure to rescue our complex systems from social maladies.

In view of the above, education in fine and applied arts presents itself as a factor of development in any nation, being that it has a potent force of driving the desired knowledge into our teaching and learning system to propel the wind of positive change for the actualization of any nations’ goals and objectives. Art has been seen as the highest form of human expression and a reflection of the society that creates it as it has the creative ability to fashion the society as well as objects into its finest forms (Stevenson, 2010). There have been a number of educational innovations to ensure the viability of our indigenous knowledge systems. One of which can be seen in the application of educational media and technology in the teaching and learning exercise. However, fine art can also play a vital role in aiding educational media and technology to create a functional and enduring structure of the Teaching–learning system.

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However, there are quite a number of debilitating factors hindering the attainment of various human capacity developments using Fine and Applied Arts, among which are inadequate studio equipment/ educational infrastructure, lack of adequate manpower resource and funding.

**Concept of Educational Repositioning**

The idea of repositioning, rebuilding, renovation, reinvigorating, as well as reforming, are all thoughts and concepts considered and deployed in the bid to revive and restore our educational system to a capacity to effectively deliver the primary aim of knowledge impartation. Knowledge, they often say, is power. Knowledge is information, understanding and skills gained through education or experience (Hornby, 2000). The knowledge/ skills which citizens of a country acquire go a long way to determine their level of patriotism and contribution to national integration and development. Should it be emphasised that knowledge is bedrock of any nation, needed to effectively harvest her abundant human and material resources to be able to attain a defined developmental goal as well as be numbered among the developed economies of the world. In the Nigerian context of necessity, functional education provides the pathway towards attaining knowledge. It is not far-fetched from the innovative propensity of our indigenous government policies. The role of innovations in education cannot be over-stressed as it is man’s means of survival in a rapidly dynamic environment. Innovation according to the Oxford advanced learner’s dictionary is the introduction of new things, ideas or ways of doing something. The idea of adoption of the 9-3-4 system of education currently in use against the moribund 6-3-3-4 and the initial 6-5-4 school curriculum arrangement among other initiatives is an indication of the need for review of the pedagogical knowledge system of educational development in Nigeria. No wonder, Miles, as cited by Ughamadu and Okoye (2006), defines innovations as a deliberate, novel specific change, which is thought to be more efficient in accomplishing the goals of a system. Explaining further, he suggests that innovation is a deliberate effort to improve any practice in other to achieve desired objectives and seen also as willed and planned for, since it doesn’t occur spontaneously.

Unruh and Alexander in Ughamadu (2006) viewed innovation as the introduction of a fresh strategy by authorities, a given school or community, supported by a driving force, and implemented as a practical advance that deviates from initially established or traditional forms. This view is supported by Salami (2016) who describes educational innovation as reconstruction of the educational system in Nigeria ‘hinged on four pillars; curriculum, environment, teacher training and assessment. Stating further that, they are definitely not new projections but demand new approaches, compulsion and high intensity’ as well as tenacity. The reality to this end is that we must conscientiously drive our learning system to one that is more environment friendly, explanatory, exploratory, learner centred and creative. This thus highlights the innovative sense in the employment of educational media.

**The Impact of Educational Media in Restructuring**

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Educational media emphasises the range of resources put together to improve the learning exercise. It can be referred to as the use of variety of instructional resources like textbooks, charts, models/mock-ups, radio, television and other projected and non-projected media which brings about efficiency and effectiveness of the teaching- learning process (Ughamadu 2006).

Agun also in Ughamadu (2006) relates Educational media as all forms of information carriers that can be used to store, preserve, transmit or retrieve information. These are seen as essential tools and devices through which knowledge can be passed on or obtained. It involves using technology as tool to create enduring experience in the teaching and learning exercise. Thus Educational technology has its apt place as an instrument of educational media. This is so because, Educational technology hinges greatly on the use of media as well as equipment in the teaching-learning exercise. This explains the use of a range of hardware varying from the barest which is chalkboard, demonstrative model, and so on, to the intermediate levels; characterized by the use of overhead projectors, television and computer assisted instructional processes to aid the teaching and learning exercise. Thus, educational technology involves the adoption of scientific principle of learning in the instructional process (Ughamadu, 2006). The focus of technology in education is to enhance and promote efficiency and effectiveness in the teaching-learning process by the following ways;

1. Educational media promotes stimulation of interest based on the idea that once interest is built, effective learning is very likely to take place. With Educational technology there is a high tendency of arousal of student’s interest and curiosity to learn and know more.
2. Educational Technology helps speed up the rate of learning especially at infant stage by applying the use of motion pictures to aid learning. Children learn faster by this process. Thus making education more productive.
3. Educational Technology has potential of assisting the classroom teacher to better introduce any subject matter thereby helping to cut down time and stress inherent in gathering some physical materials in attempt to present certain subject matter for example a teacher introducing the topic (Counting) to pupils for the first time. Films, television, cassettes etc can be used to introduce such subject for presentation to learners.
4. Educational media makes learning more immediate, real and permanent: with its adoption, learning becomes more effective and immediate being that it is more explicit and creates real life impressions as well as instils memorable occurrence for learners when exposed to it.

**Contribution of Fine and Applied Arts Education for Sustainable Growth of Nigeria**

Stevenson (2010) has opined that Art is the highest form of human expression and a reflection of the society that it creates. Thus, creativity is a great virtue in fine and applied arts as it portrays the ability to create any object in its finest form. Although, the layman’s view of art is that, it entails merely drawing or painting with no knowledge that it goes beyond that. Robert (1999) suggests that one creative role of art is the use of imagination as a skill to create objects expressing ideas or feelings particularly in drawing, painting or sculpture. In the same way, Art in school curriculum can be used as a major transformational tool and a formidable instrument for socio-economic empowerment and reconstruction (Oladumiye, E et al. 2012). Nevertheless, there is a difference between what can be termed Education in the arts (teaching in Fine and Applied Art, Music, Drama, Crafts and so on.) and Education through the arts (the use of arts as pedagogical tool in other subjects, such as in the elementary sciences, literacy, technology and so on).

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Thus education which uses creative and artistic pedagogies to teach, all curricula by adopting education through the arts, is aiding knowledge impartation in the teaching–learning exercise ensuring the overall academic attainment, reduces school disaffection while promoting positive cognitive transfer. Drawing as a skill for example is an invaluable and indispensible tool that aids the study of various subjects in school curriculum; biology, engineering, geography, medicine history and the elementary sciences to mention but a few. No wonder art has in recent times, been redefined and broadened to encompass many practical applied fields, aesthetics and applied arts as stated by the National Art Education Association in the National Visual Arts Standards. Furthermore, drawing as an aspect of visual art, forms the intellectual exercise by which an individual is trained to observe and think. It is basically referred to as the mother of Arts since it forms the base point of learning in arts and other fields.

Education in Fine and Applied Arts presents itself as a key factor of development in any nation, being that it has a potent force of driving the wind of positive change for the actualization of any nations’ goals and objectives. For instance, in ceramics (a career in fine and applied arts) there is engagement in the creation of ceramic wares for household and industrial fittings especially electrical insulators, switches and conductors of various sizes which are essential for power supply. The deficiency of skilled professionals in this production will bring about low output in these products more so considering how power and energy impacts on our economy, it is logical to assume that a short fall of the products which enhance effective distribution of power will lead to shortage of electricity supply to homes and industries. The non availability of power inadvertently discourages investment industrialization and therefore will bring about high cost of operation of the very few industries in any society just as is experienced in Nigeria today. This triggers a hike in the running cost of production of consumer goods. The resultant effect is the unbearable high cost of purchase as well as high standard of living. This condition ripples into poor or low pace of economic growth and development. However, with right education in place, purposeful and steady development can be earned as minds that are educated are more rational and productive. That's why, education can be said to arm the child with knowledge, skills and values required for effective living within his environment. This is so, because education has a way of helping individuals attain self realization and actualization, leading to more economic gains. In other words, education is geared towards acquisition of knowledge and survival skills for service, productivity as well as contribution to the development of the society. Thus Education endows the individual with the power of creativity in other to be productive and add to the Society in service and knowledge.

Furthermore, Ughamadu (2006) defined education as the process by which young people acquire the cultural heritage, knowledge, ideals and the civilisation of the past so as to be able to take part in the civilisation of the present and help build the civilisation of the future. Therefore art education, whether formal or informal, is a major means of acquisition of skills, knowledge and capability with intent to cause a positive individual and societal transformation. Education is one of the greatest investments any nation can make, for its economic, technological, political and philosophical development in both human and material resources. So, Art education is a veritable instrument that inhibits individual and national development. Although, Itedjere (2006) argued that laterally, education has no aims apart from what people now attribute as its aims. Hence it is simply the pathway towards achieving whichever objectives people wish that it helps them to achieve. Therefore, the society must decide what its art education and

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development will help them achieve in the course of time.

**Conclusion**

Education broadens the horizon of any individual and propels them to have a more objective and critical mindset towards any discuss, hence it has become appropriate that education in art be given more attention as it serves as a pedagogical tool towards comprehension of other fields/ enterprise. Additionally, it makes sense to state that training in Vocational and Technical Skills is essential to drive economic growth and diversification.

Finally, it has become imperative that all stake holders must strive to promote awareness on the economic importance of diversification of the economic strategies towards Technical and Vocational Skills Acquisition.

**Recommendation**

Government should be judicious enough to increase budgetary allocation to education through the realization of the importance of education in the overall national development and economic growth. Therefore, there should be deliberate efforts by government to increase investment in education especially in the study of Technical and Vocational Skills Acquisition Courses especially Fine and Applied Arts in the following areas:

1. Funding and equipping of studio/ workshops in tertiary institutions.
2. Invest into Art exhibitions and yearly shows which can also serve as source of revenue generation.
3. A vigorous sensitisation and orientation in Art Aesthetics and Appreciation to increase patronage of Art shows.
4. It is necessary to have an incentive/ remuneration for studio art tutors.
5. The UNESCO recommendation of 26% of Gross National Product for educational budget should be adopted and implemented to make adequate fund available for providing adequate school facilities and resources.

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**STUDENT-RELATED CONSTRAINTS TO EFFECTIVE DELIVERY AND COVERAGE OF AGRICULTURAL SCIENCE SYLLABUS IN ENUGU STATE, NIGERIA**

***Ali, Nwakile, Ojiako & Ejiofor***

**BY**

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**Abstract**

*The study investigated student-related constraints to effective coverage and delivery of agricultural science syllabus of secondary schools in Enugu state. Two research questions and two hypotheses guided the study. The population for the study comprised of 126 agricultural science teachers and 120 senior secondary students made up of senior (SP) and deputy senior prefects (DSP) of each government secondary school in the zone. SPs and ASPs were utilized because their opinions would represent the opinions of the school and thereby eradicating the need for sampling. Hence, the entire population was used because of the manageable size. For effective investigation, a four point scaled 49 item structured questionnaire face validated by three experts from Department of Agricultural Education, University of Nigeria, Nsukka with a Cronbach Alpha reliability coefficient of 0.88 was used for data collection from the respondents. The mean and standard deviation were used to answer the research questions, while t-test was used to test the hypotheses at .05 level of significance. It was found out that there are 14 student-related constraints to effective coverage and delivery of agricultural science syllabus. In addition, the study identified 29 strategies for effective coverage and delivery of agricultural science syllabus by students. The study therefore recommends among others that the state government should establish agricultural science scholarship board in every education zone in the state to retain and motivate students’ interest in the subject and school authorities should ensure adequate provision of adequate teaching and learning materials for teachers and students to ensure that the agricultural science syllabus is effectively covered.*

**Keywords:** Student-Related Constraints; Agricultural Science; Syllabus; Strategy

**Introduction**

Agricultural science is a broad multidisciplinary field that encompasses the parts of natural, economic and social sciences that are used in the practice and understanding of agriculture in schools. International Labour Organization (2009) stated that agricultural science is the application of scientific principles in rearing animals and producing crops for food, fiber, bio-fuel, drugs and other products used in sustaining and enhancing human life. Agricultural science, as a subject in secondary schools in Nigeria, seeks to teach the students the principles of using scarce resources to produce crops and animals to feed the world’s population while preventing problems that affects human health, environment and the society in general (Ikehi, Ifeanyieze &Ugwuoke, 2014). It is recognized as one of the subjects which is vital to peoples’ life as it embraces science, technology, culture and business (Ali, Paradang &Panebi, 2015). Agricultural science as a subject in secondary school is taught by agricultural science teacher. Secondary school is any private or government approved educational institution that is higher than primary schooland lower than tertiary institution. According to Ikehi, Ifeanyieze and Ugwuoke (2014), secondary schools are educational institutions below tertiary level established to inculcate in learners the societal needs, values and challenges which are dynamic in nature. Secondary school is divided into two major categories thus; junior and senior secondary. In senior secondary school, agricultural science as a subject is taught to students who are in SS1, SS2 and SS3 by agricultural science teachers who are trained teachers in either colleges of education or in universities for the realization of the subject objectives (Paradang, 2014; Ali, Parading & Panebi, 2015).

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It is noted that the main objectives of agricultural science are as follows; to provide students with adequate skill to make a living and progressively advance farming, to provide occupational entry-level skill in agriculture to interested secondary school students, to advance food production through improvement of agriculture production techniques in secondary school, to prepare secondary school students adequately for production and marketing farm commodities efficiently, to prepare secondary school students for conservation of soil and other natural resources(Olaitan, 1988).There are four basic goals for teaching agricultural science as identified thus; utilitarian, personal development, economic growth and cultural values (Yara & Otieno, 2010; Ali, Parading &Panebi, 2015). This is because agricultural science has both theoretical and practical content that students are exposed to. The theoretical and the practical contents of agricultural science which the senior secondary students are exposed to in other to achieve the objectives of the subject depends on the coverage of agricultural science syllabus (Paradang, 2014).

Syllabus is an outline and summary of topics to be covered in an educational programme. Nnabuo, Okorie, Agabi and Igwe (2005) opined that any document which shows how each subject should be taught and the details through which it should be treated is a subject syllabus. Aiyepeku (2006) outlined the basic content of a teaching syllabus as; topics to be taught at various levels in the school, specific behavioral objectives which should indicate knowledge to be acquired after the teaching of any given topic, the content of all the topics selected for inclusion in the syllabus as well as materials and suggested activities for teaching listed topics. Syllabus in view of Slattery and Carson (2005) is an outline and summary of topics to be covered in an education or training course. The author noted that it is descriptive (unlike the prescriptive or specific curriculum). The author further explained that a syllabus is often either set out by an examination board or prepared by the professor who supervises or controls the course quality. The syllabus serves many purposes for the students and the teacher such as ensuring a fair and impartial understanding between the teacher and students such that there is minimal confusion on policies relating to the subject, setting clear expectations of materials to be learned, behavior expected in the classroom and effort to be put into the subject by the student (Habanek, 2005). Slattery and Carlson (2005) describe the syllabus as a contract between faculty members and their students, designed to answer students’ questions about a course (subject), as well as inform them about what will happen should they fail to meet course (subject) expectations. Habanek stresses the importance of the syllabus as a vehicle for expressing accountability and commitment in school.

Both syllabus and curriculum are often fused, and usually given to each student at the beginning of any new academic session so that the objectives and the means of achieving them will be made known to everyone. A syllabus usually contains specific information about the subject such as information on how, where and when to contact the lecturer, teacher and teaching assistants, an outline of what will be covered in the course, a schedule of test dates and the due date for assignments, the grading policy for the course and specific classroom rules (Brown, 2007).The agricultural science syllabus in Nigeria is developed by the Nigeria Education Research Development Council (NERDC) and the syllabus is primarily concerned with academic preparation of secondary school students and must be covered when broken into smaller unit called scheme of work. Aiyepeku (2006) defined scheme of work as a breakdown of syllabus for work planned to be covered weekly. Nnabuo in Nnabuo, Okorie, Agabi and Igwe (2005) describe scheme of work as breaking down into topics of a subject to be covered on a weekly basis of each school term. Therefore, the academic performance of agricultural science students depends on how well the scheme of work is covered by the teachers and students respectively in their day to day class room encounter. It is emphasized that certain content in the agricultural science syllabus be covered and specific concepts and skill mastered by secondary school students. These contents attributes are tested for by the West Africa Examination Council (WAEC) and National Examination Council (NECO) after three years in senior secondary classes.

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In Nigeria and in Enugu state to be precise, over the years, performance of agricultural science students in WAEC and NECO examination has continued to show a downward spiral despite the effort made by the State Government and the Post Primary Education Board to improve performance of the students (Shikuku, 2009). Researchers have identified factors that are believed to cause poor performance such as societal poor view of agricultural science and government policies (Miheso, 2012).Similarly, Shikuku (2009) and Dzama (2006) have established that these factors do not directly contribute to poor performance instead late or non-coverage of the syllabus contributes a lot to poor performance. It is believed that teacher-related constraints are responsible for ineffective coverage of agricultural science syllabus hence poor performance in WAEC and NECO examination among students. This is in line with the findings of Ali, Paradang and Panebi (2015) that teacher’s level of education, experiences, teaching methods, poor time management in class and poor attendance to classes by the teachers are teacher-related constraints to effective coverage of agricultural science syllabus, hence influencing performance of students in WAEC and NECO examination. However, there is a strong feeling that not only teacher-related constraints influence effective coverage of agricultural science syllabus but also student-related constraints.

Student-related constraints are conditions at the students’ dispensation that have an influence on the teaching-learning process thereby affecting the performance of students. This study intends to identify and document student-related constraints to effective delivery and coverage of agricultural science syllabus and the strategies for effective coverage of agricultural science syllabus in Nsukka Education Zone of Enugu State Nigeria.

**Research Questions**

The following research questions guided the study;

1. What are the student related constraints to effective delivery and coverage of agricultural science syllabus in Nsukka education zone?
2. What are the strategies for effective delivery and coverage of agricultural science syllabus zone?

**Hypotheses**

The following null hypotheses were tested at 0.05 level of significance.

1. There is no significant difference between the mean responses of teachers of agricultural science and the agricultural science students on the student-related constraints to effective delivery and coverage of agricultural science syllabus in Nsukka education.
2. There is no significant difference between the mean responses of teachers of agricultural science and the agricultural science students the strategies for effective delivery and coverage of agricultural science syllabus in Nsukka Education zone.

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**Methodology**

Two research questions guided the study while two null hypotheses were formulated and tested at the probability level of 0.05 level of significance. Descriptive survey research design was adopted for this study. Descriptive survey research design in the view of Olaitan, Ali, Eyo and Nwoke (2000) is a plan and a strategy that the investigator wants to adopt in order to obtain solution to research problem using questionnaire in collecting, analyzing and interpreting the data. The design is appropriate for this study because it provided the researcher the opportunity of eliciting opinions from the respondents in the areas of the study using questionnaire. The study was conducted in Nsukka Education Zone of Enugu State, Nigeria. The population of the study was 246, comprised of 126 Agricultural Science teachers in the sixty government secondary schools in the zone and 120 senior students made up of senior (SP) and deputy senior prefects (DSP) of each government secondary school in the zone. *SPs and* ASPs were utilized because their opinions would represent the opinions of the school and thereby eradicating the need for sampling*.* The entire population was used because of the manageable size. A four-point response options of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) with values 4, 3, 2, and 1 respectively made up of 48 structured questionnaire items developed from literature reviewed was used for data collection. The instrument was face validated by three experts in the Department of Agricultural Education, University of Nigeria, Nsukka. The experts were requested to proffer suggestions for improving the instrument in meeting the purpose of the study. The corrections suggested were effected and integrated into the modified copy of the instrument which was used for data collection. A Cronbach alpha reliability technique was adopted for determining the internal consistency of the instrument. A reliability coefficient of 0.88 was obtained. This indicated a high positive relationship among the opinions of the respondents. Two hundred and forty-six (246) copies of the questionnaire were administered to the respondents through personal contact with the help of three research assistants. The assistants were briefed, guided and instructed on how to administer and retrieve the instrument. Two hundred and thirty-eight copies of the questionnaires were returned representing 96% rate were returned and analyzed.

The data collected was analyzed using weighted mean to answer the research questions, standard deviation was used in determining how close or otherwise the respondents were to the weighted mean of each item and to one another in their responses. Table of real limit of numbers was applied in decision making for the research questions thus; 1.00 -1.49 –Strongly Disagree, 1.50-2.49 –Disagree,2.50-3.49 –Agree and 3.50-4.00- Strongly Agree while any item with its standard deviation less than 1.96 from the weighted mean value were considered very good response and highly clustered around the mean. For the null hypothesis, they were upheld if the calculated level of significance is greater than 0.05 or otherwise rejected.

**Results**

The results of the study were obtained based on the two research questions answered and the null hypotheses formulated, tested and presented in table 1 and 2 below.

**Table 1:** Mean Response Ratings, standard deviation, and t–test Scores of the Differences between the Mean Responses of teacher of agricultural science and the agricultural science students on the student-related constraints to effective delivery and coverage of agricultural science syllabus in Nsukka education zone of Enugu state. (N1+N2 =246).

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|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** | **N=126** | **SD1** | **N2 =120** | **SD2** |  | **SDG** | **Df** | **t-cal** | **REMARKS** | |
|  |  |
| 1 | The interest of the students towards agricultural science | 3.52 | 0.50 | 3.46 | 0.50 | 3.49 | 0.50 | 244 | 0.37 | A | NS |
| 2 | The attitudes of the students towards agricultural science | 3.54 | 0.69 | 3.53 | 0.74 | 3.54 | 0.72 | 244 | 0.78 | SA | NS |
| 3 | Motivation of the students towards agriculture | 3.54 | 0.48 | 3.52 | 0.62 | 3.53 | 0.55 | 244 | 0.65 | SA | NS |
| 4 | Parental influence on the students | 3.52 | 0.54 | 3.53 | 0.52 | 3.53 | 0.53 | 244 | 0.94 | SA | NS |
| 5 | Age of the students | 3.48 | 0.67 | 3.53 | 0.40 | 3.51 | 0.54 | 244 | 0.66 | SA | NS |
| 6 | The gender of the students | 3.48 | 0.56 | 3.58 | 0.39 | 3.53 | 0.48 | 244 | 0.27 | SA | NS |
| 7 | Marital status of the students | 1.61 | 0.88 | 1.58 | 0.48 | 1.60 | 0.68 | 244 | 0.74 | D | NS |
| 8 | Peer influence on the students | 1.59 | 0.64 | 1.44 | 0.53 | 1.52 | 0.59 | 244 | 0.12 | D | NS |
| 9 | Students health status | 3.52 | 0.72 | 3.51 | 0.59 | 3.52 | 0.66 | 244 | 0.80 | SA | NS |
| 10 | Inadequate learning materials for students | 3.50 | 0.83 | 3.53 | 0.85 | 3.52 | 0.84 | 244 | 0.81 | SA | NS |
| 11 | Students absenteeism | 3.54 | 0.48 | 3.50 | 0.64 | 3.52 | 0.56 | 244 | 0.72 | SA | NS |
| 12 | Students Involvement On Social Media Like Facebook, 2go, WhatsApp, Badoo, Instagram, Twitter and electronic games | 3.63 | 0.43 | 3.50 | 0.54 | 3.57 | 0.49 | 244 | 0.76 | SA | NS |
| 13 | Students’ involvement in household chores when they get home after school hours | 1.74 | 0.68 | 1.52 | 0.62 | 1.63 | 0.65 | 244 | 0.01 | D | S |
| 14 | Students previous academic activities or achievement | 3.46 | 0.51 | 3.48 | 0.71 | 3.47 | 0.61 | 244 | 0.66 | A | NS |
| 15 | Residential area of the students | 3.50 | 0.77 | 3.49 | 0.89 | 3.50 | 0.83 | 244 | 0.79 | SA | NS |
| 16 | Educational level of students’ parents | 3.11 | 0.87 | 3.47 | 0.81 | 3.29 | 0.84 | 244 | 0.00 | A | S |
| 17 | Numbers of practical done by the students | 2.85 | 0.77 | 3.46 | 0.69 | 3.16 | 0.73 | 244 | 0.00 | A | S |
| 18 | Number of years student spent in studying agricultural science | 1.24 | 0.56 | 1.35 | 0.75 | 1.30 | 0.66 | 244 | 0.21 | SD | NS |
|  |  |  |  |  |  |  |  |  |  |  |  |

KEY: = Mean of Teacher, = Mean of Student, =Grand mean, SD1 =Standard Deviation of teacher, SD2 =Standard Deviation of student, SDG =Grand Standard Deviation , NS= Not Significance, S= Significance.

Table 1 had eighteen items, 10 items had their means ranging from 3.50 to 3.57 and they were within the response category of strongly agree, 4 items had their means ranging from 3.16 to 3.49 and fell within the response category of agree, 3 items had their mean ranging from 1.52 to 1.63 and fell within the response category of disagree and 1 item had its mean to be 1.30 and fell within the response category of strong disagree. The results above indicated that the respondents strongly agreed that 6 items are the student constraints inhibiting effective coverage of agricultural science syllabus in Nsukka education zone of Enugu state whereas 8 items were agreed by the respondents as the student related constraints inhibiting effective coverage of agricultural science syllabus in the education zone. They disagree with 3 items and strongly disagree with 1 item as the student-related constraints inhibiting effective coverage of agricultural science syllabus in the education zone. The grand standard deviations on the student-related constraints inhibiting effective coverage of agricultural science syllabus in Nsukka education zone of Enugu state ranged from 0.49 – 0.84 indicating that the respondents were not very far from the mean of one another in their responses. The result indicated that all the items had their t-cal ranging from 0.10 – 0.94 which are greater than 0.05 level of significance except items 13, 16 and 17 that had t-cal to be 0.01, 0.00 and 0.00 respectively which are less than 0.05 level of significance. Therefore, the null hypotheses of no significant differences was upheld for the entire items except items 13, 16 and 17. This shows that the mean responses of the respondents do not differ significantly on the student on the student related constraints to effective coverage of agricultural syllabus in Nsukka education zone of Enugu state for all the items except items 13, 16 and 17. As a result of this, the alternative hypotheses of significant differences was upheld for items 13, 16 and 17

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**Research Question Two**

What are the strategies for effective coverage of agricultural science syllabus?

**Table 2:** Mean Response Ratings, standard deviation, and t–test Scores of the Differences between the Mean Responses of teacher of agricultural science and the agricultural science students on the Strategies for effective delivery and coverage of agricultural science syllabus in Nsukka education zone of Enugu state. (N1+N2 =246)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | Item Statement | **N1 =126** | **SD1** | **N2 =120** | **SD2** | **2** | **SDG** | **Df** | **t-cal** | **REMARKS** | |
|  | |
| 1 | Recruitment of adequate numbers of professionally trained and qualified agricultural science teachers to serve as role model to students | 3.60 | 0.55 | 3.30 | 0.52 | 3.45 | 0.54 | 244 | 0.19 | A | NS |
| 2 | Provision of adequate teaching and learning materials for teachers and students | 3.20 | 0.88 | 3.38 | 0.67 | 3.29 | 0.76 | 244 | 0.46 | A | NS |
| 3 | Proper monitoring and supervision of teachers and students. | 3.80 | 0.45 | 3.33 | 0.47 | 3.57 | 0.46 | 244 | 0.04 | SA | S |
| 4 | Building of functional modern agricultural science laboratory in schools for students and teachers utilization | 3.00 | 0.76 | 3.20 | 0.97 | 3.10 | 0.87 | 244 | 0.59 | A | NS |
| 5 | Involving students for proper maintenance of available teaching and learning materials in schools | 3.40 | 0.73 | 3.46 | 0.75 | 3.43 | 0.74 | 244 | 0.57 | A | NS |
| 6 | Provision of functional school demonstration farm for crop production practical and ranch for animal production practical to retain students’ interest | 3.60 | 0.99 | 3.50 | 0.44 | 3.55 | 0.72 | 244 | 0.81 | A | NS |
| 7 | Strict adherence to school time table by students and teachers to sustained interest of the students | 3.00 | 0.67 | 3.22 | 0.88 | 3.11 | 0.78 | 244 | 0.68 | A | NS |
| 8 | Building of functional school library for the students and teachers | 3.20 | 0.80 | 2.72 | 0.88 | 2.96 | 0.84 | 244 | 0.58 | A | NS |
| 9 | Good dormitory accommodation for students | 3.40 | 0.59 | 3.33 | 0.67 | 3.37 | 0.63 | 244 | 0.39 | A | NS |
| 10 | Building of school toilets to enable students and teacher ease themselves if necessary | 2.00 | 0.88 | 1.39 | 0.78 | 1.70 | 0.83 | 244 | 0.75 | D | NS |
| 11 | Provision of ICT facilities for teaching and learning of agricultural science as a way of retaining students’ interest | 3.40 | 0.79 | 3.37 | 0.62 | 3.39 | 0.73 | 244 | 0.04 | A | S |
| 12 | Provision of relevant textbooks to students for teaching and learning of agricultural science | 3.80 | 0.66 | 3.39 | 0.47 | 3.60 | 0.57 | 244 | 0.08 | SA | NS |
| 13 | Use of good teaching methods and techniques to retain students’ interest  ***Ali, Nwakile, Ojiako & Ejiofor*** | 2.00 | 0.89 | 3.44 | 0.89 | 2.72 | 0.89 | 244 | 0.00 | A | S |
| 14 | Reducing teacher-student ratio to 1:30 to enable the teacher monitor the students’ progress in agriculture | 3.00 | 0.55 | 2.91 | 0.69 | 2.96 | 0.62 | 244 | 0.86 | A | NS |
| 15 | Proper and effective utilization of the 40 minutes by teacher and students for teaching and learning of agricultural science | 3.20 | 0.68 | 3.24 | 0.70 | 3.22 | 0.69 | 244 | 0.92 | A | NS |
| 16 | Organization of agricultural exhibition and excursions for students to boost their interest in learning agriculture | 3.80 | 0.76 | 3.07 | 0.59 | 3.44 | 0.68 | 244 | 0.08 | A | NS |
| 17 | Provision of scholarship for agricultural science students | 4.00 | 0.85 | 3.39 | 0.89 | 3.69 | 0.87 | 244 | 0.01 | SA | S |
| 18 | Organization of inter-school agricultural science competition for students within the education zone | 3.44 | 0.25 | 4.00 | 0.25 | 3.72 | 0.25 | 244 | 0.02 | SA | S |
| 19 | Making copies of agricultural science syllabus available for students to enable them know what are to be covered | 3.80 | 0.60 | 3.24 | 0.62 | 3.52 | 0.61 | 244 | 0.13 | SA | NS |
| 20 | Supplementary readings by students at home to cover the syllabus | 3.80 | 0.62 | 3.17 | 0.59 | 3.49 | 0.61 | 244 | 0.06 | A | NS |
| 21 | Allocation of more time to agricultural science since it has both theory and practical aspects | 3.07 | 0.46 | 4.00 | 0.46 | 3.54 | 0.46 | 244 | 0.03 | SA | S |
| 22 | Giving regular assessment to students by teachers | 4.00 | 0.89 | 3.41 | 0.87 | 3.71 | 0.88 | 244 | 0.01 | SA | S |
| 23 | Use of video tapes in teaching and learning of agricultural science to boost students’ interest | 3.80 | 0.49 | 3.39 | 0.98 | 3.60 | 0.74 | 244 | 0.08 | SA | NS |
| 24 | Use of internet in teaching and learning for students’ interest retention in agricultural science | 3.60 | 0.99 | 3.43 | 0.89 | 3.52 | 0.94 | 244 | 0.49 | SA | NS |
| 25 | Good parental support for agricultural science as a viable option for students in the future | 3.40 | 0.50 | 3.39 | 0.54 | 3.40 | 0.52 | 244 | 0.97 | A | NS |
| 26 | Creation of conducive learning environment for the students | 3.40 | 0.58 | 3.41 | 0.55 | 3.41 | 0.57 | 244 | 0.96 | A | NS |
| 27 | Motivate and persuade students to learn agricultural science by their teachers and parents | 2.80 | 0.87 | 2.93 | 0.81 | 2.87 | 0.84 | 244 | 0.71 | A | NS |
| 28 | Maintain quietness and orderliness in the school to ensure effective coverage of agricultural science syllabus among students | 1.40 | 0.72 | 3.35 | 0.58 | 2.38 | 0.65 | 244 | 0.00 | D | S |
| 29 | Frequent monitoring of students’ progress in school | 3.00 | 0.80 | 3.40 | 0.88 | 3.20 | 0.84 | 244 | 0.29 | A | NS |
| 30 | Good positive home-school relationship to boost students’ interest in agricultural science subject | 3.40 | 0.66 | 3.11 | 0.66 | 3.26 | 0.66 | 244 | 0.41 | A | NS |
| 31 | Use of mother tongue in teaching to remove language barrier caused by English language to the students | 3.35 | 0.87 | 3.40 | 0.69 | 3.38 | 0.51 | 244 | 0.78 | A | NS |

KEY: = Mean of Teacher,  = Mean of Student, =Grand mean, SD1 =Standard Deviation of teacher, SD2 =Standard Deviation of student, SDG =Grand Standard Deviation , NS= Not Significance, S= Significance.

Table 2 had thirty-one items, 10 items had their means ranging from 3.52 to 3.72 and they fell within the response category of strongly agree, 19 items had their means ranging from 2.72 to 3.49 and fell within the response category of agree, 2 items had their mean ranging from 1.70 to 2.38 and fell within the response category of disagree. The results above indicated that the respondents strongly agreed that 10 items are strategies for enhancing effective coverage of agricultural science syllabus in Nsukka Education zone of Enugu state. The respondents agreed that 19 items were the strategies to enhance effective coverage of agricultural science syllabus in Nsukka education zone of Enugu state. They disagree with 2 items as the strategies for enhancing effective coverage of agricultural science syllabus in Nsukka education zone of Enugu state. The grand standard deviation on the strategies for enhancing effective coverage of agricultural science syllabus in Nsukka education zone of Enugu state ranged from 0.24 – 0.94 indicating that the respondents were not very far from the mean of one another in their responses. The result further indicated that all the items had their t-cal ranging from 0.06 to 0.97 which was greater than 0.05 level of significance at 246 degree of freedom except, item 3, 11, 13, 17, 18, 21, 22, and 28, which had their t-cal values to be from 0.00 to 0.04 which is less than 0.05 level of significance. Therefore the null hypothesis of no significant differences was upheld for the entire items except item 3, 11, 17, 18, 21, 22, and 28. This shows that the respondents’ mean responses do not differ significantly on the strategies for enhancing effective coverage of agricultural syllabus in Nsukka education zone of Enugu state for all the items except item 3, 11, 17, 18, 21, 22, and 28. As a result of this the alternative hypothesis of significant differences was upheld for item 3, 11, 17, 18, 21, 22, and 28. These divergent views must have been predicated on some peculiar conditions. These divergent views observed in the two research questions must have been predicated on some peculiar conditions thus: The agricultural science teachers must have relied on fact that they are the people who implement curriculum and syllabus at the class room level while the students on their own are the curriculum recipient not implementers like teachers hence varying opinion.

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**Discussion**

**Student-Related Constraints to Effective Coverage of Agricultural Science Syllabus**

The findings of the study on student-related constraints to effective coverage of agricultural science syllabus highlighted that the respondents agreed that 14 out of 18 Student-related constraints to effective coverage of agricultural science syllabus in Nsukka education zone of Enugu state were considered either strongly agree or agree since they were rated above the cutoff point of 2.50. In their ratings “Students involvement on social media like Facebook, WhatsApp, Badoo, Instagram, Twitter and electronic games” with a mean of 3.57 and “The attitudes of the students towards agricultural science” with a mean of 3.54 were the highest student-related constraints to effective coverage of agricultural science syllabus in Nsukka education zone of Enugu state. The respondents rated “Number of years students spent in studying agricultural science” with a mean of 1.30 and “Marital status of the students” with a mean of 1.60as not student-related constraints to effective coverage of agricultural science syllabus in central education zone of Enugu state. The findings are in agreement with Olowa (2009) who noted that student-related variables that influence student performance as regards syllabus coverage include age of the students, drinking habits, residential area of the students, education level of parents, land-size owned by family, students’ interest, and overall performance of the students. This is also in line with Azwifarwi (2004) that positive attitudes towards agricultural science seem to be lacking among students, hence poor performance on the subject. The result further agreed with Amadalo, Shikuku and Wasike (2012) that absenteeism by both the teacher and the students played a major role in non-coverage of the syllabus. Okuom,Simatwa, Olel and Wichey stated that due to frequent flooding in Nyando district in Kenya, absenteeism of students led to low syllabus coverage and therefore to poor performance. Kiveu and Mayio (2009) similarly attest to the role of absenteeism on syllabus coverage when they noted that lack of fees can cause student from being absent from school as well as the health condition of the students and teachers.

The findings of the study on strategies for enhancing effective coverage of agricultural science syllabus highlighted that the respondents agreed that 29 out of 31 strategies for enhancing effective coverage of agricultural science syllabus in Nsukka education zone of Enugu state were considered either strongly agree or agree since they were rated above the cutoff point of 2.50. In their ratings “Organization of inter-school agricultural science competition” with a mean of 3.72 and “Giving regular assessment to students by teachers” with a mean of 3.71 were the highest strategies for enhancing effective coverage of agricultural science syllabus in the education zone. In the ratings of the respondents, “Building of school toilets to enable students and teacher ease themselves” and “Maintaining quietness and orderliness in the school to ensure coverage of syllabus” which had a mean of 1.70 and 2.38 respectively were not regarded as strategies for enhancing effective coverage of agricultural science syllabus in the education zone. The findings are in agreement with Omo-Ojugo and Franklin (2008) that through proper maintenance of classroom blocks, dormitories, desks, chairs, computers, furniture to foster teaching and learning in school as well as coverage of subject syllabus enhance students’ performance. The authors equally found out that adequate textbooks, workbooks and adequate number of teachers in school promote teaching and learning as well as coverage of syllabus to enhance better student performance. This is in agreement with Wabuke et al (2013) that materials used in school by the teachers determine the content the teachers deliver to the students. Visual teaching aids such as flip charts promote learning; almost all students recall having seen words or sentences (Glewwe, 2000). Materials used in schools by the teachers not only influence the students’ attitude towards biology, but may also affect their preparation for examination purposes (Wabuke et al 2013). Agricultural science is a practical science subject. Theory and practice must go hand in hand, that which is taught in theory must be applied and demonstrated practically to bridge the gap between theory and practice. This can be achieved through training and retraining of teachers to ensure complete coverage of syllabus (Ali, Paradang &Panebi, 2015). The authors further found out that encouraging competition among school students also can be seen as a powerful strategy for effective coverage of agricultural science syllabus as every school would want their students to be the best thereby covering the syllabus to restore confidence and reduce exam phobia in them and enhance better performance. Azwifarwi (2004) noted that competition between schools is encouraged because each school wants to do better than the other and in this context good results are everything.

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**Conclusion**

The study outlined students-related constraints to effective delivery and coverage of agricultural science syllabus and strategies for enhancing effective coverage of agricultural syllabus in Nsukka education zone of Enugu state, Nigeria. It is believed, therefore, that when all these student-related constraints to effective coverage of agricultural science syllabus are identified, documented and made available to the stakeholders through seminars, workshops and conferences, the problems posed by them will be properly handled by school authority, teachers and students. Consequently, this will enhancestudents’ performance in agricultural science subject in internal and external examination in the education zone.

**Recommendations**

In line with the findings it is, therefore, recommended that;

1. The state government establishes agricultural science scholarship board in every education zone in the state to retain and motivate students’ interest to cover the subject syllabus*.*
2. School authorities should ensure adequate pprovision of adequate teaching and learning materials for teachers and students to ensure that the agricultural science syllabus is effectively covered.

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1. There should be utilization of ICT facilities such as interactive whiteboard which stimulates interest of students leading to effective coverage of the agricultural science syllabus.

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**EVALUATION OF THE TECHNICAL AND VOCATIONAL SKILLS POSSESSED BY BASIC TECHNOLOGY TEACHERS IN JUNIOR SECONDARY SCHOOL IN LAGOS STATE FOR EFFECTIVE DELIVERY.**

**BY**

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**Abstract**

*The study focused on the evaluation of the technical and vocational skills possessed by basic technology teachers in junior secondary school in Lagos State. The study used descriptive survey design.Three research questions guided the study and the population of the study comprised of 30 pre-vocational education teachers in government owned junior secondary school in Ojo local government area of Lagos State. A 30 item validated and structured questionnaire was developed and used for data collection. To establish the reliability, Cronbach alpha statistics was used to determine the internal consistency of the instrument at 0.86. Data were analysed using the mean to answer the research questions. The major findings of the paper showed that the teachers of Basic technology do not possess adequate skills in wood work technology, technical drawing and information and communication technology. The paper recommended that the identified skills items shortage which are required by basic technology teachers for effective delivery should be utilized for retraining of the Basic technology teachers.*

**Keywords**: Evaluation, Technical and Vocational Skills, Basic Technology and Teachers.

**Introduction**

The global competiveness in the industry coupled with the emerging technology in the industry has presented a need for the teachers of Basic Technology to equip themselves with saleable skills that are relevant in the industry. These skills are required for improving practical projects of junior secondary school students, since this is the foundation of technical and vocational education.Basic Technology, formerly known as *Introductory Technology* was structured to assist learners to develop interest in technology. The aim is that by the end of the junior secondary school, presently known as Basic 9, technological appreciation would have been activated and sustained, and foundation laid for students' entrance into a vocation of their choice. According to the Federal Republic of Nigeria (2013), the three main objectives of Basic Technology as stated in the National Policy of Education are: to provide pre- vocational orientation for further training in Technology; to provide Basic Technology literacy for everyday living and to stimulate creativity.Miller, Bakare and Ikatule, (2010), opined that Basic Technology is one of the essential pre-vocational and integrated subjects that are offered by students in junior secondary schools and that it exposes students to basic ideas and concepts of technology and skill development in the various components that make up the subject. Aremu (2015) is also of the view that Basic Technology is a foundation subject on which future technological development of students are built for those interested in vocational technical courses or engineering in higher institutions. According to the Federal Ministry of Education (2007), Basic Technology is a compulsory subject in the 9 year basic education programme. Its purpose according to the report is to contribute to the achievement of the national education goals by inculcation of technology literacy, exposure of students to the world of work to match their talents and interests for wise vocational choice and inculcation of positive attitudes towards work as a source of human identity, livelihood and power.

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Basic Technology gives opportunities to students to use tools and machines used in the industries. This helps to develop good attitudes towards technology and the industry. Basic technology as a subject is very important for the scientific and technological advancement of any nation as its usefulness cuts across all fields of human endeavor (Onasanya, Fakomogbon, Shehu and Soetan, 2010). Uwaifo (2011), also stressed that the sole aim of the subject is to develop in children the aptitude for things that are technical and not necessarily making them technicians. Basic technology according to (Oviae, 2008), can be viewed as a subject taught in the junior secondary school with the incorporation of many skilled subjects such as woodwork, metal work, electrical/electronics, mechanics, technical drawing, information and communication technology and local crafts to enable students of that school age be abreast with basic technological skills and competencies for useful living in the society. In this context, Basic technology can be seen as a technological foundation that prepares the interest of junior secondary school student in technical and vocational skills in the areas of Safety, Drawing, Wood work, Hand tools, Cutting tools, Electrical, Electronics, Metal work, Automobile, Building and Computer technology so that when they get to senior secondary level they can be able to know what profession and skill to pursue.

Skill is the expertness in practical ability, dexterity and tact (Okorie, 2001). Okorie explained further that, to possess a skill is to demonstrate the habit of acting, thinking and behaving in a specific activity in such a way that the process becomes natural to the individual through repetition or practice. As a principle, vocational education will be effective in proportion as it trains the individual directly and specifically in the thinking habits and the manipulative habits required in the occupation itself.Ogwa and Nnachi (2016) remarked that to possess a skill is to demonstrate the habit of acting, thinking or behaving in a specific activity which has become so natural to the individual through repetition or practice such that it becomes automatic. Central among this definition is the idea that skill could be regarded as ability, which is an outcome of learning and practice to the point of perfecting, which could be applied subsequently by the learner. The result is accuracy in carrying out a task through organized learning and repetitive practice. The process of acquiring a skill in basic technology as adapted from Holding (1985) involves the following methods which are: identification of tools, use of tools, equipment and materials and their care, speed and accuracy of work done, job planning and analysis of tasks, utilization of relevant principles and information, reading diagrams, symbols and drawing and understanding summative evaluation of overall work done both in the workshop, laboratories and in drawing rooms. It should be noted that a basic technology teacher in junior secondary school should be conversant with this method for national development.

Teachers are the mainstay of the educational system (Afe, 2002). Teaching according to Suleiman and Nuhu (2009), is a process of imparting knowledge, skills and attitude in order to bring about a desirable change inlearners. Teaching can also be referred to as an occupation, enterprise and an act of explaining, reading and writing. The primary goal of teaching is to ensure that meaningful learning occurs (Yinusa, 2014). Teaching effectiveness is the extent that student’s performance improves after a period of instruction in a manner consistent with the goals of instruction (Olatoye, 2006). Johanesse (2012) asserted that effective teaching is those activities which bring about the most productive and beneficial learning experience for students and promotes their development as learners. That is, teaching strategies utilized by teachers in technical and vocational education programme must also improve in line with the changing needs of the contemporary society (Okoye, 2010). Therefore, a good teaching strategy for technical and vocational skill acquisition lessons in Nigeria must possess certain qualities capable of bringing out the innovations and making the lesson student-centered activity. The basic technology teacher is expected to possess adequate and sufficient practical experience necessary for imparting the skills to the learners through the use of appropriate teaching methods. That is why Ubong and Oguzor (2007) maintained that teachers should emphasize on the practical aspects of the different specialties for the technical and vocational education. Yinusa(2014) argued that effective teaching goes beyond just imparting knowledge but it is a purposeful activity carried out by someone with a specialized knowledge in a skillful way to enhance the cognitive, affective and psychomotor development of a person or group of persons in the subjects or course of study.

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The major aim of Basic Technology inJunior Secondary School in Nigeria is to explore the fundamentals and develop vocational competencies among youths so that they can appreciate the technological world and contribute maximally to the nation’s economic growth. The Basic technology curriculum provides that the teaching and learning of the subject should be both theoretical and practical in nature (NPE, 2004). In order to improve the achievement of students in basic technology, teachers are expected to be competent in teaching the content areas of the basic technology curriculum. This is because; there is a decline in the academic performance in basic technology in the country (NECO chief examiner report 2015). This poor performance has been recorded for some years by the examining bodies of Junior Secondary Certificate Examination (JSCE), school promotion examinations and the qualifying examinations conducted by the State Ministry of Education. This poor performance has been ascribed to non-availability of skilled teachers for basic technology in the areas of wood work technology, technical drawing and information and communication technology (Nwoji, 2000) and also the use of teachers who are not technically inclined to teach basic technology (Idowu2006).It has also been recorded in the past according to Akpan, Usoro and Akpan (2010), that pupils acquire skills in basic technology which makes them fit into the society properly and the reverse is now the case as students on completion of the course cannot carry out simple daily maintenance on technological appliances. Several complains have been attributed to this among which arenon-availability of qualify technical teachers and also the use of secondary school graduates or science graduates to teach basic technology, hence the need for its evaluation.

Evaluation is the process of determining the extent of change in learners’ behaviour after teaching a particular skill or area of knowledge. Okoro, (2000) is of the view that ultimate evaluation determines how well the individual performs in their place of employment after graduation. Nwacukwu (2003), also defined evaluation as the process of determining how much learning the learner in an educational setting has acquired. In general terms, it is the process of reaching decisions. It is obvious that the importance of this level of manpower to the development of Lagos State and Nigeria in general cannot be under estimated. Therefore, it is essential to know how the teachers of basic technology possesses those skills that will enable them impact the right knowledge and skills to the students for national development. Evaluation in this context will not be perceived as a measurement of student’s success alone but also of teaching effectiveness and efficiency in using resources. Evaluation of this nature is necessary in the present Nigeria school system, if education is to keep pace with time and it is against this backdrop that this study intends to evaluate the technical and vocational skills possessed by Basic Technology teachers in Junior Secondary School in Lagos State for effective delivery in wood work technology, technical drawing, and information and communication technology.

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**Research Questions**

1. What are the wood work technology skills possess by the teachers of Basic Technology?
2. What are the technical drawing skills possess by Basic Technology teachers?
3. What are the Information and Communication technology skills possessed by Basic Technology teachers?

**Methodology**

A survey research design was adopted for this study. Survey research design is a plan structure, strategy that the enumerator wants to adopt in order to obtain situation to research problems using questionnaire in collecting, analysing and interpreting the data, (Olaitan, Ali, Eyo andNwoke, 2005). The study was carried out in ten government owned Junior Secondary Schools in Ojo Local Government area of Lagos State. The area was chosen based on the fact that each of the secondary school has Basic Technology as a subject and they have similar problem of poor performance in Junior Secondary School National Examination Council Exam. The population for this study is all the 30 teachers that are teaching Basic Technology in this ten schools and the questionnaire for the study consisted of 30 items which were based on the research questions. A structured questionnaire was the instrument for data collection. The items used a 4-point response scale of highly possessed, averagely possessed, slightly possessed and not possessed which were assigned numerical values of 4, 3, 2, and 1 respectively. The instrument was subjected to face and content validation by two lecturers from the School of Vocational and Technical Education, Adeniran Ogunsanya College of Education Otto-Ijanikin, and one Basic Technology teacher from Ojo Junior Secondary School, to attest the appropriateness of the instrument in measuring what it is intended to measure. The instrument was trial tested on 30 basic technology teachers in Badagry Local Government. This yielded a reliability co-efficiency of 0.86 using the Cronbach Alpha formula. The data was collected by administering the questionnaire directly on the respondents by the researchers and two research assistants. The data collected from this study were analyzed using mean and standard deviation in answering the research questions. Any item with a mean value of 2.50 and above was regarded as possessed while any item with a mean below 2.50 was regarded as not possessed.

**Research Question 1**

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What are the wood work technology skills possessed by the teachers of Basic Technology?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Item Statement | X | SD | Remarks |
| 1 | Skills in using the drilling machine for boring hole on the wood surface accurately. | 2.32 | 0.74 | Not possessed |
| 2 | Skills in fixing hinges on door and cabinets perfectly. | 2.48 | 0.74 | Not possessed |
| 3 | Skills in using the circular saw machine for ripping wood perfectly. | 2.20 | 0.86 | Not possessed |
| 4 | Skill in reading the caliper | 2.48 | 0.76 | Not possessed |
| 5 | Skill in reading the tape rule. | 2.72 | 0.91 | Possessed |
| 6 | Skills in using the work bench effectively. | 2.53 | 0.87 | Possessed |
| 7 | Skills in using the Try Square effectively. | 2.38 | 0.75 | Not Possessed |
| 8 | Skills in using the brace effectively. | 2.24 | 1.06 | Not Possessed |
| 9 | Skills in using the work vice effectively. | 2.15 | 0.87 | Not Possessed |
| 10 | Skills in using the hand saws for cutting or sawing wood effectively. | 2.31 | 0.69 | Not Possessed |

Table 1 showed that 8 items out of 10 on the wood work technology skills possess by the teachers of Basic Technology had their mean values below the cutoff point of 2.5. The standard deviation also indicates that the responses do not vary widely from the mean.

**Research Question 2**

What are the technical drawing skills possessed by Basic Technology teachers?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Item Statement | X | SD | Remarks |
| 1 | Skills in using the French curve effectively. | 2.74 | 0.60 | Possessed |
| 2 | Skills in setting up of the drawing paper to the board effectively. | 2.56 | 0.78 | Possessed |
| 3 | Skills in dividing a line into equal parts. | 2.60 | 0.77 | Possessed |
| 4 | Skills in knowing the different types of lines | 2.47 | 0.81 | Not possessed |
| 5 | Skills in bisecting a straight line | 2.71 | 0.60 | Possessed |
| 6 | Skills in constructing an angle | 2.70 | 0.81 | Possessed |
| 7 | Skills in constructing of polygons | 2.48 | 0.68 | Not Possessed |
| 8 | Skills in scaling of the work done. | 2.35 | 0.69 | Not Possessed |
| 9 | Skills in drawing free hand. | 2.15 | 0.83 | Not Possessed |
| 10 | Skills in identifying first and third angle projection. | 2.41 | 0.64 | Not Possessed |

Table 2 showed that 5 items out of 10 on the technical drawing skills possess by Basic Technology teachers had their mean values ranged from 2.56-2.74 which is above the cutoff point of 2.5. 5 items had their mean score below the cutoff point of 2.5. The standard deviation also indicates that the responses do not vary widely from the mean.

**Research Question 3**

What are the Information and Communication Technology skills possessed by Basic Technology teachers?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Item Statement | X | SD | Remarks |
| 1 | Skills in knowing the main parts of the computer. | 2.38 | 0.92 | Not possessed |
| 2 | Skills in been conversant with Microsoft word. | 2.47 | 0.63 | Not possessed |
| 3 | Skills in been conversant with Microsoft Excel. | 2.36 | 0.77 | Not possessed |
| 4 | Skills in browsing the internet effectively. | 2.67 | 0.76 | Possessed |
| 5 | Skills in using teleconferencing. | 2.14 | 0.88 | Not Possessed |
| 6 | Skills in connecting the computer to the printer effectively. | 2.26 | 0.81 | Not Possessed |
| 7 | Skills in saving typed work to flash and diskette. | 2.50 | 0.70 | Possessed |
| 8 | Skills in using of the PowerPoint effectively. | 2.35 | 0.69 | Not Possessed |
| 9 | Skills in using the email effectively and also sending mail with it. | 2.69 | 0.76 | Possessed |
| 10 | Skills in using ICT to teach basic technology effectively. | 2.41 | 0.74 | Not Possessed |

Table 3 showed that 7 items out of 10 on the Information and Communication Technology skills possessed by Basic Technology teachers had their mean values below the cutoff point of 2.5. The standard deviation also indicates that the responses do not vary widely from the mean.

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**Discussion**

The findings in table 1 showed that 8 items out of 10 on the wood work technology skills possess by the teachers of Basic Technology had their mean values below the cutoff point of 2.5. That means 2 items out of ten was agreed upon by the prevocational teachers in Ojo local Government as the wood work technology skills they possessed. This is in agreement with Okolie, Elom and Inyiagu (2014) who stated that many factors contribute to students poor performance in basic technology among which are: Inability of the teachers to put across the concepts to the students, Lack of skills and competence required for teaching, Shortage of qualified basic technology teachers and Lack of teaching materials and necessary equipment. This is also in agreement with Odu (2013) who lamented that “unfortunately, a recurring problem besieging basic (technical) education since its inception has been the absence of adequate facilities to foster effective teaching and learning. The implication of the result is that majority of basic technology teachers in junior secondary school who are supposed to be proficient in the skills they taught lack this skills.

The findings in Table 2 showed that the teachers possessed five skills out of the ten technical drawing skills needed for effective delivery, and even the skills possessed are not highly possessed. This is in agreement with Amos (2007), who posited that technology teachers in which basic technology is one of them do not possess the needed competences to teach practical skills and drawings. In most cases, the teachers lay more emphasis on theory rather than practical’s. This is also in agreement with Ogwa (2002) who carried out a study on the causes of poor performance of students in Basic Technology and found that some teachers did not major in Basic Technology yet, they teach the subject. He further discovered that many teach the subject with unqualified qualification.

The findings in Table 3 showed that basic technology teachers possessed three items out of the ten items on the information and communication technology skills needed for effective delivery. This is in agreement with Goro (2000) who stated that teachers must be provided with and have access to the necessary technological equipment training and resources that will result in enriched students learning. Goro went further to say that, the teachers in training therefore, need quite a good number of infrastructure, training, educational facilities like machines, tools, equipment and books in order to impact good knowledge to the students. Teachers need to be provided with good recreational facilities for their physical mental and social developmental growth.

**Conclusion**

Functional pre-technical and vocational education requires the use of tools and machines to acquire the necessary skill. The introduction of basic technology in junior secondary school is to encourage the acquisition of practical’s as well as vocational skills by students so that they can use their hands in making and repairing items that are made of wood, metals and electrical appliances. It was discovered that some of basic technology teachers lack skills in wood work technology, technical drawings and information and communication technology. It was also noted that this skills are needed for the students to acquire prevocational skills.

**Recommendation**

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Based on the findings of the study, the following recommendations were made:

1. The identified skills items shortage which are required by basic technology teachers for effective delivery should be utilized for retraining of the basic technology teachers in wood work technology, technical drawing and information and communication technology for effective teaching of basictechnology in junior secondary school.
2. Modern tools and equipment should be adequately supplied and maintained regularly for improving practical projects in basic technology in junior secondary school.
3. Government should make funds available and sponsor basic technology teachers to attend conferences, seminars and workshops on utilization of ICT for effective instructional delivery.

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**SKILLS REQUIRED BY WOODWORK TECHNOLOGY TEACHERS TO ENHANCE PRACTICAL LESSON DELIVERY IN TECHNICAL COLLEGES IN NIGERIA.**

***Adelakun Oluniyi & Anaele Edmond***

**BY**

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**Abstract**

*Technical education is key to technology which is the backbone to every nation’s development. However, its efficiency to fulfill its purpose in any nation’s development hinges on its delivery. This study sought to determine skills required by Woodwork Technology teachers to enhance practical* lesson delivery in Technical Colleges in Nigeria. *To achieve this, the study adopted a descriptive survey research design. Three research questions were posed to guide the study. The population for the study was 103 made up of 68 Woodwork teachers in the Technical Colleges and 35 Woodwork teachers in Colleges of Education in South-west, South-east and North-central geo-political zones of Nigeria. The instrument for data collection was a researcher developed questionnaire based on five-point Likert scale. The instrument was face-validated by three experts from universities and Cronbach Alpha was used to establish the reliability which yielded a coefficient of 0.89. The data collected were analysed using mean to answer the research questions. Any item with mean value of 3.50 and above was regarded as agreed while mean less than 3.50 was rejected. The findings of the study revealed that Woodwork teachers in the technical colleges are inadequately prepared in practical skills which consequently, affect the performance of their students. The study however recommended among others that Woodwork teachers should update their skills to deliver practical lessons effectively and incorporate the identified methods of Woodwork practical lessons delivery in their day-to-day practical lessons.*

**Keywords**:Woodwork technology, Technical Colleges, Technical teacher, Instructional delivery, Skill, Practical projects.

**Introduction**

Woodwork Technology is the practical application of scientific knowledge, theories, and methods including the process of working wood into a useful or desired form. United States Department of Agriculture (USDA) (2015) described wood technology as the knowledge of the structure, properties, and processing of wood and the application of this knowledge to industrial processes; including the utilization of wood design, production/manufacture, or reconstruction of wood products. Woodwork has areas of specialization and these include carpentry, joinery, Cabinet Making and Wood Machining. National Policy on Education (FRN) (2004) identified areas of woodwork as follows: Upholstery, Carpentry and Joinery, Wood Machines and Furniture Making. Woodwork trade is the art of producing objects or things from wood such as doors, windows, roofs, beds, cupboards, chairs, and tables. Woodwork Technology programmes are offered in the post-primary (secondary schools and technical colleges) and post-secondary schools (Colleges of Educations, Polytechnics, and Universities) in Nigeria.

Technical Colleges are post-primary institutions that run vocational education programmes and offer various vocational subjects or trades in order to equip individuals with appropriate knowledge and skills required for either paid jobs or self-employment (Okoro, 2006). FGN (2004) outlined the aim of technical colleges which include preparation for useful living within the society and preparation for higher education. It means that the quality of instruction at technical colleges, must in addition to the development of the cognitive or intellectual abilities of the youth, be oriented towards the acquisition of appropriate work skills, abilities and competencies for the individual to live and contribute to the development of the society.

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Skill is the ability, proficiency or dexterity to do something well arising from talent, experience, training and/or practice. A skilled person in a certain job is an individual who has undergone some extensive training in such job and has thus mastered the activities that lead to successful performance in the job. Okorie (2001) stated that skill is manual dexterity through repetitive performance of an operation. Delmar (2006) stated that Woodwork requires technical skills from students for good performance in areas, such as how to use and maintain hand and power tools. Skill can be acquired through experience and training. Some of the skills used in woodworking include wood cutting, wood planing, article assembling, finishing to among others. These skills are taught in technical colleges by technical teachers.

Technical teacher is an individual who is trained in scientific and technological knowledge and skills in formal training setting on how to impart knowledge to students/workers for a particular technical career. James (2009) posited that technical teacher is a person who is trained in science, industrial technology, and methods for imparting knowledge, technical skills and attitudes to the learners. Adelowo (2015) stated that technical teachers are those who have acquired technical training - theories and practices of education who would later impart to someone the knowledge, skills and attitude to improve and solve technological problems. The impact of technical teacher on the students is connected to their instructional delivery styles.

Instructional delivery refers to those approaches, techniques and methods employed by a teacher/instructor to ensure effective instruction. Instructional delivery refers to the structuring of educational materials to achieve an effective teaching-learning process (Olaitan & Agusiobo, 1981). Teaching involves imparting knowledge whereas learning involves acquiring knowledge. Learning is defined as a relatively permanent change in behaviour as a result of experience. When an individual’s behaviour is influenced or modified such that the individual thinks or behaves differently consequent upon the newly acquired information, principles, data, skill or knowledge, learning is said to have taken place (Greyson & Lewis, 1979). If adequate instructional delivery method is effectively employed by the teacher of technology and vocational education (TVE) in a conventional classroom setting, higher order thinking is improved and better levels of creative expression are fostered among students (UNESCO, 2008). Instructional delivery is believed to be a source of critical thinking or inspirational disposition on the part of students (Johannesse, 2004). According to Archer & Hughes (2011) and Knight (2012) the following are identified as the hallmarks of an explicit approach for teachers: teacher selects the learning area to be taught; He sets criteria for success; He informs students of criteria ahead of the lesson; teacher demonstrates to students the successful use of the knowledge/skills through modeling; He evaluates student knowledge/skills acquisition; teacher provides remedial opportunities for acquiring the knowledge/skills, if necessary; teacher provides closure at the end of the lesson. Instructional competencies are essential practices that technical teachers must master to effectively instruct students to maximize knowledge and skill acquisition in practical projects.

Practical projects in woodwork are meant to be taught with the use of instructional materials on how to handle woodwork machine/hand tools, equipment and materials. These equipment and infrastructures are grossly lacking or inadequate in the technical colleges (Akpan, 1983; Uzoagulu, 1993; Rafai, Aede, & Muhammad, 2013). According to Ojimba (2012), the curricula are based on foreign model which has evolved under ideal conditions (staff, equipment, infrastructure, and training opportunities among others) that are not easily duplicated in developing countries. Toolstoday (2018) identified five steps for planning woodworking projects as: always start with function, the type of materials that are needed, plan the tools and cutters that will be needed, develop and re-develop your thumbnails and establish the glues, fillers, and finishes that will be needed from these, the correlation between the practical project and availability of training equipment is positive hence, this has high impact on the performance of both the teachers and students in practical projects.

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Performance of teachers in technical colleges and indeed most of the TVET institutions offering woodwork programme is inadequate. This could be traced to the curriculum used for training of teachers in the colleges of education and universities of technology education. Olunloyo (2002) pointed out that the current curricula are adjudged to be too academic and overloaded with intellectual content in pure science and mathematics at the expense of Basic Engineering and Technology. The curricula in tertiary institutions of TVET schools gives an average of 90% for the theoretical classes and 10% for laboratory/practical courses in terms of practical training while the technical college/secondary students have an average of 67% for the theoretical classes and 33% for laboratory/practical courses (Yaro & Cheledi, 2012). A large number of technical teachers who never had technical college training but commenced their technical training from colleges of education or rather acquired training from university where less attention is given to practical training would find it difficult to effectively perform in practical lesson delivery in technical college because one cannot give what he does not have. Therefore, technical teachers require supplementary skills to perform adequately in Woodwork practical lesson delivery.

**Statement of the Problem**

National Policy on Education (FGN) (2004) stated the objectives of technical colleges Woodwork trades are to provide graduates with knowledge and practical skills necessary for self- reliance and gainful employment and to provide basic understanding for functional living in the society. The technical teachers who are supposed to be skillful, knowledgeable and be seen as authorities in their areas of specialization are under-performing. This was traced to lapses in curricula which give an average of 90% for the theoretical classes and 10% for laboratory/practical courses in terms of practical training offered in tertiary institutions while the technical college/secondary students have an average of 67% for the theoretical classes and 33% for laboratory/practical courses.

Consequently, most of Woodwork Technology graduates are faced with problem of unemployment because they are regarded as unemployable, and cannot start their own businesses as stated in the National Policy on Education. This issue of unemployment in Nigeria has been the major problem of set-back and economic development of Nigeria. In addition, the performance of Woodwork Technology students in National Business and Technical Examinations Board (NABTEB) examination in practical projects in the recent years is not encouraging. The implication is the production of army of unemployed youths roaming the streets and seeking for paid jobs that are not available. To curb this worrisome trend, it is imperative to determine the skills required by Woodwork Technology teachers to enhance practical lesson delivery in Technical Colleges in Nigeria.

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**Purpose of the Study**

The general purpose of the study was to determine skills required by Woodwork Technology teachers to enhance practical lesson delivery of Woodwork in technical colleges in Nigeria. Specifically, the study sought to determine the:

# Basic skills for carrying out a typical Woodwork practical project.

# Skills required to enhance woodwork practical lesson delivery.

# Strategies to be employed to enhance woodwork practical lesson delivery

**Research Questions**

The following research questions guided the study;

# What are the basic skills for carrying out a typical Woodwork practical project?

# What are the skills required to enhance woodwork practical lesson delivery?

# What are the strategies to be employed to enhance woodwork practical lesson delivery?

**Methodology**

The study adopted a descriptive survey research design. Gall, Gall and Borg (2007) described descriptive survey research as a method of data collection using questionnaire or interview to collect data from a sample that has been selected to represent a population to which the findings of the data analysis can be generalized. The population for the study was 103 made up 68 Woodwork teachers in the Technical Colleges and 35 Woodwork teachers in Colleges of Education in South-west, South-east and North-central geo-political zones of Nigeria. No sampling was carried out since the population is of a manageable size. The instrument used for data collection of the study was a structured questionnaire. It was developed by the researchers after review of available literature on the effect of practical lesson delivery on students’ performance, The instrument is based on five-point Likert scale of Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D) and Strongly Disagree (SD) with nominal values of 5, 4, 3, 2 and 1 respectively. The instrument was face-validated by three experts from universities and tested for reliability using Cronbach Alpha which yielded a reliability coefficient of 0.89. The data were collected by the researchers and three research assistants in the zones covered by the study. All the instruments administered were completed and returned for data analysis. Mean was used for answering the research questions. Based on the five-point Likert scale, any item with mean value 3.50 and above was regarded as agree while any item with mean less than 3.50 was regarded as disagree. The data were analysed using the Statistical Package for Social Sciences (SPSS) version 20.0.

**Results**

**Research Question 1**

# What are the basic skills for carrying out a typical Woodwork practical project?

**Table 1:** Mean Responses of Respondents on Basic Skills to carry out a Typical Woodwork Practical Project

**N=103**

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** |  | **SD** | **Remark** |
| 1. | Choose or design a project | 4.85 | 0.36 | Agree |
| 2 | Make a cutting list to guide the details of the construction. | 4.34 | 0.72 | Agree |
| 3 | Bring the materials (wood) into the shop and let it acclimatize for a couple of days | 3.91 | 0.82 | Agree |
| 4. | Put on the appropriate safety wears (such as overall, nose mask, eye wears among others and as the need arises) | 4.53 | 0.65 | Agree |
| 5. | Plane the board/ plank to get straight and flat surface | 4.42 | 0.34 | Agree |
| 6. | Prepare the parts to the required length, widths and thickness for joints | 4.11 | 0.44 | Agree |
| 7 | Set out the appropriate joints | 4.57 | 0.53 | Agree |
| 8. | Cut the appropriate joints | 4.82 | 0.41 | Agree |
| 9. | Sand the surface of the parts with sander or using a medium grit abrasive | 4.63 | 0.67 | Agree |
| 10. | Trial assemble to make sure the parts fit properly. | 4.00 | 0.92 | Agree |
| 11. | Test the parts for flatness and squareness | 4.31 | 0.40 | Agree |
| 12. | Make sure joints are not too tight | 3.82 | 0.73 | Agree |
| 13. | Glue the assembled parts. | 4.78 | 0.23 | Agree |
| 14. | Clamp the assembled parts | 4.36 | 0.44 | Agree |
| 15 | Sand the surface lightly in the grain direction with fine grit abrasive | 4.41 | 0.38 | Agree |
| 16 | Wipe the wood and remove any dust | 3.85 | 0.53 | Agree |
| 17 | Spread a coat of sanding sealer with a brittle brush | 4.01 | 0.46 | Agree |
| 18 | Allow to dry properly | 4.35 | 0.45 | Agree |
| 19 | Scuff the sanding sealer with 220-grit abrasive | 3.94 | 0.58 | Agree |
| 20 | Apply the first lacquer | 4.31 | 0.36 | Agree |
| 21 | Allow to dry properly | 4.00 | 0.41 | Agree |
| 22 | Scuff with 220-grit abrasive. | 4.07 | 0.62 | Agree |
| 23 | Apply the second lacquer | 4.23 | 0.34 | Agree |
| 24 | Allow to dry properly | 4.05 | 0.25 | Agree |
| 25 | Complete the project within a specified time limit | 4.49 | 0.37 | Agree |

Data presented in Table 1 showed that the respondents agreed on basic skills to follow to carry out a typical woodwork practical project based on the means which ranged from 3.82 to 4.85. The standard deviation (SD) showed that the respondents were close in their responses with SD values ranged from 0.23 to 0.82.

**Research Question 2**

# What are the skills required to enhance woodwork practical lesson delivery?

**Table 2:** Mean Responses of Respondents on Skills Required to enhance Woodwork Practical Lesson Delivery

**N=103**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** |  | **SD** | **Remark** |
| 1. | Ability to carry out appropriate workshop safety practices | 4.62 | 0.23 | Agree |
| 2 | Ability to use the correct operational procedures in construction | 4.51 | 0.71 | Agree |
| 3 | Ability to sketch and design objects effectively | 4.74 | 0.67 | Agree |
| 4. | Ability to interpret drawings effectively. | 4.80 | 0.25 | Agree |
| 5. | Mastery of woodwork theory and applications | 4.01 | 0.81 | Agree |
| 6. | Effective use of hand tools (such as chisel and hammer) | 4.54 | 030 | Agree |
| 7 | Ability to apply basic woodwork operations (such as sawing, planing/smoothing, drilling, assembling) | 4.83 | 0.21 | Agree |
| 8. | Apply wood finishing (such as sanding, application of paints, stain and varnishes) | 4.61 | 0.63 | Agree |
| 9. | Ability to use of materials (such as nails, adhesives, fitting) | 4.48 | 0.41 | Agree |
| 10. | Ability to cut vital joints in woodwork construction (widening joint, angle joint, and framing joint ) | 4.76 | 0.32 | Agree |
| 11.  ***Adelakun Oluniyi & Anaele Edmond*** | Ability to operate power tools effectively | 4.40 | 0.57 | Agree |
| 12. | Ability to utilize appropriate skills in machining (such as single tenons, planer) | 4.25 | 0.71 | Agree |
| 13. | Ability to utilize woodwork equipment (such as fire and personal protective equipment) effectively | 4.30 | 0.68 | Agree |
| 14. | Ability to repair woodwork tools and equipment | 4.25 | 4.13 | Agree |
| 15 | Ability to replace damaged parts of machines and accessories | 4.61 | 0.34 | Agree |
| 16 | Ability to improve the quality of practical project to stand the test of time for effectiveness | 4.95 | 0.63 | Agree |
| 17 | Ability to use of appropriate teaching skills | 4.50 | 0.25 | Agree |
| 18 | Ability to incorporate ICT in practical projects woodwork | 4.13 | 0.81 | Agree |
| 19 | Ability to identify student with special characteristics and initiate ways of helping them | 4.35 | 0.51 | Agree |
| 20 | Ability to integrate school-based and work-based learning in teaching | 4.45 | 0.75 | Agree |

Data presented in Table 2 showed that the respondents agreed on skills required to enhance woodwork practical lesson delivery based on the means which ranged from 4.01 to 4.83. The standard deviation (SD) showed that the respondents were close in their responses based on the SD values which range from 0.55 to 0.93.

**Research Question 3**

# What are the strategies to be employed to enhance woodwork practical lesson delivery?

**Table 3:** Mean Responses of Respondents on Strategies to be employed to Enhance Woodwork Practical Lesson Delivery

**N=103**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** |  | **SD** | **Remark** |
| 1. | State out the objectives of the practical lesson | 4.93 | 0.21 | Agree |
| 2 | Determine the standard of performance expected of the students | 4.66 | 0.32 | Agree |
| 3 | Provide the students with information and steps needed to carry out the practical project | 4.85 | 0.30 | Agree |
| 4. | Provide the students with the materials for carrying out the practical project | 4.93 | 0.18 | Agree |
| 5. | Take each step involved in the practical project and ask the student to do theirs in same manner | 4.57 | 0.62 | Agree |
| 6. | Engage students in learning by doing not only by hearing | 4.31 | 0.26 | Agree |
| 7 | Be mobile to be sure all students are on track with what they are supposed to be doing. | 4.55 | 0.42 | Agree |
| 8. | Ask students some questions to strengthen their comprehension as the practical lesson is going on | 4.75 | 0.15 | Agree |
| 9. | Ask questions before pointing at a student to answer | 4.66 | 0.39 | Agree |
| 10. | If the student is confused or cannot answer, calmly repeat the same question or give a direct clue | 4.58 | 0.58 | Agree |
| 11. | Score the practical projects to determine the level of performance | 4.81 | 0.36 | Agree |
| 12. | Compliment positive behaviour and hard work | 4.64 | 0.66 | Agree |
| 13. | Strengthen teacher-student relationship | 4.28 | 0.71 | Agree |
| 14. | Give students assignment on similar practicals but with more tasks | 4.73 | 0.38 | Agree |
| 15 | Close the practical lesson with questions for clarification | 4.67 | 0.43 | Agree |

Data presented in Table 3 showed that the respondents agreed on strategies to be employed to enhance woodwork practical lesson delivery based on the means which range from 4.28 to 4.93. The standard deviations (SD) showed that the respondents were close in their responses with SD values range from 0.15 to 0.71.

**Discussion of Results**

The findings presented in Table 1 show that the respondents agreed on all the items as basic steps to carry out a typical Woodwork practical project. This is in line with WIKIHOW (2017) which enumerated how to design, build, and finish a woodworking project as follows: choose or design the project for construction, select and prepare the materials, bring the materials into the shop and let them acclimate for a couple of weeks, cut the appropriate joints, make sure joints are not too tight, Also in consonance with Jeff (2018) on steps in the woodworking process which among others include: pre-mill all the boards to get straight and flat pieces, cut the joints, dry fit the assemblies to make sure everything fits properly, glue the assembly and clamp it, square the parts, and clean up. Also supported by Umar (2013) on basic steps to follow to carry out a typical woodwork practical project which include: prepare pieces of wood members to the required length, widths and thickness for framing joints, set out the appropriate framing joints, trial test to assemble the pieces of framed members, test the famed parts for flatness and squareness, complete the project within a specified time limit. It also in agreement with Toolstoday (2018) which identified five steps for planning woodworking project as: always start with function, the type of materials that would be required, plan the tools and cutters that would be needed, develop and redevelop and modify the plan as the need arises and establish the glues, fillers, and finishes that would be required.

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The findings presented in Table 2 show that the respondents agreed on all the items on skills required for enhancing woodwork practical lesson delivery. This in agreement with Aliyu (2014) that effective use of hand tools (such as chisel and hammer), mastery of woodwork theory and application, integration of school-based and work-based learning in teaching, incorporation information and communication technology (ICT) in practical projects woodwork, identification of student with special characteristics then develop on that to facilitate learning. This is in agreement with Umar (2013) that skills to make a cutting list to guide the details of the construction, interpret vital framing joints in woodwork construction, cut vital joints in woodwork construction and operate power tools effectively for woodwork construction exercises are required to required enhancing woodwork practical lesson delivery

## The findings presented in Table 3 show that the respondents agreed on all the items on strategies to be employed to enhance woodwork practical lesson delivery. The findings agreed with Janelle (n. d,) who suggested five essential teaching strategies to deliver an effective lesson as: **have an objective, model your expectations, actively engage students, be mobile and compliment positive behaviour and hard work The findings also agreed with** Archer & Hughes (2011) and Knight (2012) that teacher selects the learning area to be taught, teacher sets criteria for success, teacher informs students of criteria ahead of the lesson, teacher demonstrates to the students successful use of the knowledge/skills through modeling, teacher evaluates student acquisition, teacher provides remedial opportunities for acquiring the knowledge/skills, if necessary and teacher provides closure at the end of the lesson.

**Conclusion**

There is no way one can give what he does not have. Technical teachers should skill up to meet up with the emerging trend in woodworking more importantly in the practical lesson delivery. This would improve the technical skill acquisition in technical colleges and would subsequently reduce the pervasive mediocrity and unemployment among graduates of technical colleges

**Recommendations**

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1. Woodwork teachers should update their skills in the identified skills required to deliver practical lessons
2. Woodwork teachers should incorporate the identified methods of woodwork practical lessons delivery in their day to day practical lessons delivery.
3. Government, administrators, community members, staff, parents and other stakeholders should intensify linkage between Technical institutions and industry.
4. Government, administrators, community members, staff, parents and other stakeholders should provide linkage between woodwork institutions with their foreign counterpart to keep abreast with latest development in wood technology.
5. More time should be allotted to Woodwork practical in the time-table.

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**STRATEGIES IN ACCOMMODATING SPECIAL NEEDS CHILDREN IN INSTRUCTIONAL DELIVERY FOR NATIONAL DEVELOPMENT**

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**Abstract**

*In this paper, the concept of accommodation in special needs education was reviewed. It was found that, Accommodation are types of adaptations that are made to the environment, curriculum, instruction, or assessment practices in order for students with disabilities to be successful learners and to actively participate with other students in the general education classroom and in school-wide activities. The various types of Accommodations were also discussed to include, presentations, response, setting, and timing/scheduling accommodations respectively. Accommodation planning procedures were highlighted, the five-step accommodation decision making procedures were stated to include, identifying individual needs, matching students ‘needs with ways and means of accommodation, implementing the accommodation plan, evaluating outcomes of accommodation and utilizing the outcomes. It was therefore concluded that Accommodation as a form of adaptation is indispensable in special needs education, for the fact it deals with individuals who present atypical educational needs and characteristics; ensuring that such children with special needs are not denied their right to education.*

**Introduction**

In Nigeria and elsewhere today, there is a growing recognition that including learners with special needs in general education can provide them with the opportunity to learn in natural, stimulating settings, which may also lead to increased acceptance and appreciation of differences. One goal of special education program in today’s world is to place learners with exceptionality to least restrictive environments that would allow them to maximize their academic and social potentials; as expressed in the concept of inclusive education, where all students in a school regardless of their strengths or weaknesses in any area, become part of the school community. (Eskay & Oboegbulem, 2013, P315). The Nigerian national policy on education (2004), states in this regard, the objectives of special needs education in Nigeria thus:

*To give concrete meaning to the idea of equalizing educational opportunities for all children, their physical, sensory, mental, psychological or emotional disabilities not withstanding; provide adequate education for all people with special needs in order that they may fully contribute their own quota to the development of the nation; provide opportunities or all exceptionally gifted and talented children to develop their talents, natural endowments/traits at their own pace in the interest of the nation’s technological development, ad to design a diversified and appropriate curriculum for all the beneficiaries (sect. 95. P.48).*

In special needs education, once a child has been identified as having special needs, teachers work with parents, teachers and experts to put an individualized Education Plan (IEP) together. This takes into account the accommodations the school must make for the child. Curriculum. Adaptations are therefore indispensable for the realistic and meaningful provision of education for the exceptional children. Affirming this, Obanya as cited in Chukwuemeka (2013) states that “if exceptional children were exposed only to the education experiences and materials used with normal children in regular schools, there would be no need for special education” (p.3). Schools therefore have a duty to provide an appropriate education to implement necessary accommodations for a student or child with a disability or special needs; once a child is identified as having a special need, the school must make necessary accommodations in their facilities and in the classroom.

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According to the National Dissemination Centre for children with disabilities (NDCCD) (2010), “ for many students with disabilities and for many without, the key to success in the classroom lies in having appropriate adaptations, accommodations, and modifications made to the instruction and other classroom activities”. Accommodations described in the individualized program Plan (IPP) should include only strategies and supports that different from what is typically provided in the classroom, in a bid to develop the learner in line with the stated provisions of the National Policy on Education for children with special needs.Some adaptations are as simple as moving a distractible student to the front of the class or away from the pencil sharpener or the window. Other modifications may involve changing the way that material is presented or the way that students respond to show their learning.

**Adaptations, accommodations, and modifications need to be individualized for students, based upon their needs and their personal learning styles and interests.**It is not always obvious what adaptations, accommodations, or modifications would be beneficial for a particular student, or how changes to the curriculum, its presentation, the classroom setting, or student evaluation might be made. This page is intended to help teachers and others find information that can guide them in making appropriate changes in the classroom based on what their students need.

Sometimes people get confused about what it means to have a modification and what it means to have an accommodation. Usually a **modification** means a change in what is being taught to or expected from the student. Making an assignment easier so the student is not doing the same level of work as other students is an example of a modification.

An ***accommodation*** is a change that helps a student overcome or work around the disability. Allowing a student who has trouble writing to give his answers orally is an example of an accommodation. This student is still expected to know the same material and answer the same questions as fully as the other students, but he doesn’t have to write his answers to show that he knows the information. What is most important to know about modifications and accommodations is that both are meant to help a child to leant.Accommodations are changes that remove barriers and provide your child with equal access to learning. Accommodations don’t change *what* your child is learning. Rather, they change *how* your child is learning.

This paper therefore, discusses the concept of accommodations in special needs education, types of accommodation, and strategies for planning accommodation as well as the principals involved in accommodation decision making process.

**The Concept of Accommodation in Special Needs Education**

According to the National Dissemination Centre for Children with Disabilities (NDCCD) (2010), “an accommodation is a change that helps a student overcome or work around a disability” Kenyon (2007) defines accommodation as:

*A wide range of techniques and support systems that can change a classroom environment or task and can permit a qualified individual with a disability to work around limitations in order to participate in the classroom process, performance the essential task of the class, enjoy benefits and privileges of classroom participation equal to those enjoyed by adult learners without disabilities (P.I).*

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Accommodation are types of adaptations that are made to the environment, curriculum, instruction, or assessment practices in order for students with disabilities to be successful learners and to actively participate with other students in the general education classroom and in school wide activities: They are changes in how a student accesses information and demonstrates learning; they do not substantially change the instructional level, content or performance criteria; the changes are made in order to provide a student with equal access to learning and equal opportunity to show what he or she knows and can do. (Statewide Autism Resources & Training Center, 2006, p.2).

Accordingly, Alberta Education Cataloguing in publication Data(AECPD) (2006) states that accommodation are changes or alterations in the regular way a student is expected teaching or assessment strategies, equipment or other supports that remove, or at least lessen the impact of a student’s special education needs. The goal of accommodation is to give student with special education needs the same opportunity an accommodation, is to remove or lessen barriers to the student’s performance that are a direct result of disability. They are in no way intended to modify a program or give the student with a disability any advantages (p.5).

Accommodation may include using special equipment, doing work in a different way, doing work in a different place, and changing how other think about disabilities. Sometimes accommodations are the only way to complete a task. When learning a skill is not the goal, or when learning that skill is too stressful or difficult due to the effects of the disability, the use of accommodations may be appropriate. Once a student has been identified with a special education need, accommodations should be considered to ensure that the student can access the curriculum and demonstrate knowledge to the best of his or her abilities (AECPD, 2006, P.1).

However, Wilmshurt and Brue (N.D) state that “accommodation required or a child vary based on the child’s needs as well as strengths and weaknesses. In general, there is a common set of accommodations for children who have a particular ability or disability” (Para 1).

**Types of Accommodation in Special Need Education**

Accommodations are typically categorized according to whether they are changes in presentation, response, setting, or timing/scheduling. Here is a brief description of each of these categories.

1. [**Presentation Accommodations**](http://www.specialconnections.ku.edu/?q=instruction/instructional_accommodations/teacher_tools/presentation_instructional_accommodations) allow students to access instructional materials in ways that do not require them to visually decode standard print. Students with print disabilities (defined as an inability to visually decode standard print because of a physical, sensory, or cognitive disability) may require alternate visual, tactile, or auditory formats.
2. [**Response Accommodations**](http://www.specialconnections.ku.edu/?q=instruction/instructional_accommodations/teacher_tools/response_instructional_accommodations) allow students to record their work in alternate ways or to solve or organize their work using some type of material or device.
3. [**Timing/Scheduling Accommodations**](http://www.specialconnections.ku.edu/?q=instruction/instructional_accommodations/teacher_tools/timing_and_scheduling_instructional_accomodations) change the allowable length of time for assignments, projects, and tests, and may also change the way the time is organized.

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1. [**Setting Accommodations**](http://www.specialconnections.ku.edu/?q=instruction/instructional_accommodations/teacher_tools/setting_instructional_accommodations)change the location in which instruction is given or the conditions of the setting.

**Modifications or Alterations**

Accommodations do not reduce learning expectations. They provide access. Changing, lowering, or reducing the learning expectations is usually referred to as a modification or alteration. Modifications can result in greater gaps between students and their classmates. Using modifications may result in implications that could adversely affect a student throughout his or her educational career. These modifications include:

1. Requiring a student to learn less material (e.g., fewer objectives, shorter units or lessons, fewer pages or problems)
2. Reducing assignments and tests so that a student only needs to complete the easiest problems or items.
3. Revising assignments or tests to make them easier (e.g., crossing out half of the response choices on a multiple choice test so that a student only has to pick from 2 options instead of 4).
4. Giving a student hints or clues to correct responses on assignments and tests.

**Deciding Which Accommodations to Use**

For students with disabilities, we now have a body of literature that strongly documents the difficulty of making decisions about appropriate accommodations - both for instruction and for assessment. Decisions about which accommodations to use is very individualized and should be made for each student by that student's IEP team. That's why it is vital for every member of each student's IEP team to be well informed about accommodations. A team approach to determining appropriate accommodations and then supporting students in the use of those accommodations is critical. The team needs to include the student and parents, general and special educators, paraeducators, and any support personnel who are needed to help the student use an accommodation - such as speech and language clinicians, physical and occupational therapists, and school psychologists.

There are other types of accommodations; environment accommodations, e.g., alternative seating, adaptive device; instructional accommodations, e.g providing copies of notes, alternative reading materials and assessment accommodations e.g, extra time and tests (AECPD:2006 ,Kenyon, 2007, p.9). However, accommodation have been categorized for convenient sake to include tools and procedures in the areas of presentation, response, timing/scheduling, and setting that provide equitable access to instruction and assessment for students with disabilities. (McVcy 2008, p.16, Statewide Autism Resources & Training Center, 2006, p.2, Georgia Dept. of Education Accommodation Manual, 2008, p.10).Accommodations work best when they target a specific barrier or challenge. For instance, for the child who can’t sit still to do math, an accommodation may be frequent breaks. For the child who struggles to write out answers on tests, an accommodation may be to have her give answers orally. The accommodation matches the need.

Presentation accommodations allow students to access instruction and assessments in ways that do not require them to visually read standard print. Students who benefit the most from presentation accommodations are those with print disabilities, defined as difficulty or inability to visually read standard print because of a physical, sensory, or cognitive disability. Example of presentation accommodations include visual cues, notes; outlines, large print, signing, tactile graphics, read aloud audio tape/CD synthetic speech screen reader and closed captioning.

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Similarly, response accommodations allow student to complete assignments, assessments, and activities in different ways or to solve or organize problem using some type of assistive device or organizer. Response accommodation can benefit students with physical, sensory, or learning disabilities (including difficulties with memory, sequencing, directionality, alignment, and organization). The use of scribes, word processor, speech to text, tape recorder, respond on assessment booklet, monitor assessment response placement calculator, spell check visual organizer (highlighter, place marker, etc) and graphic organizers.

In timing and scheduling accommodations change the allowable length of time to acomplete assignments, assessments, and activities, and may also change the way the time is organized students who cannot concentrate continuously for an extended period or who become frustrated or stressed easily may need frequent or extended relaxation breaks. Students who need extra time to process within text (i.g student with a learning disability who processes information slowly), to write (e.g Student with limited dexterity as a result of arthritis), or to use other accommodation or equipment (e.g, audio tape, scribe, assistive technology). Extended time frequent breaks change schedule or order of activities. Divide long assignments. However teachers need to be careful about extended time because some students do worse if they are given too much extra time.

Setting accommodations change the location in which a student receives instruction or participates in an assessment, or the conditions o an instructional or assessment setting. Students who are easily distracted in large group setting and who concentrate best in a small group or individual setting require this kind of accommodations. Student in this category include those who receive accommodations (e.g reader, scribe, frequent breaks) that might distract other students. Students with physical disabilities who need a more accessible location, specific room conditions, or special equipment. Other accommodations in this category include, reducing distractions to the student away from windows, pencil sharpener, near teacher’s desk, in a classroom with walls rather than open classroom, where there is more light provide noise buffers (headphones, etc) Change of location to use special equipment’s computer access, more work space, standing work station, and wheelchair accessibility.

However teachers should note that some student can be very embarrassed about being moved in another setting, some students are less motivated to do well if they are moved away from their peers, when moving student to another setting, make sure they will have access to all the classroom resources that they need; and note that students moved to another setting need to be monitored by an adult (Center for parent information, 2010).

**Planning Accommodations for Persons with Special Needs**

Planning accommodations is a collaborative process. In order to begin the planning process, Kenyon (2007) notes that is imperative that the student be involved in all aspects. In would be appropriate to begin by asking some pertinent questions to help determine what accommodations would best assist eh leader. Thus, in what areas does the learner have difficulties or a lack of progress? In what areas does the learner have problems? (Be very specific). Is it in reading, visual or auditory discrimination difficulty, spelling problems, visual or auditory deficit, reading comprehension, memory deficits, lack of attention, inability to focus, inability to screen out extraneous stimuli or short-term memory deficits? Does the learner experience any problems with the physical layout of the classroom? How can the physical environment can be changed to better suit the student’s needs? What kind of lighting is used? What is the noise level in the workplace? Is the classroom visually distracting? Is the classroom auditory distracting? What assistive technology devices or software has the student used in the past? How can the learner’s deficit be compensated? (accommodations can be suggested here) (p.17).

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**The Five-Step Accommodation Decision Making procedure**

In the provision of accommodation in special needs education, Chang, Richards, and Jackson cited in Kenyon (2007), Sandra, (2010) present steps in accommodation decision making. The first step in accommodation decision making is to identify individual Needs. Before providing accommodations, teachers should know the specific needs of their students with learning disabilities and what options for accommodation are available to them. However, staff should collect additional data about the needs and types of accommodations provided, which should include a general understanding about the specific learning disabilities that their student have, get specific information about their students with learning disabilities such as their individual needs and the need to know about a variety of ways and means of providing accommodations. Thus student’s own suggestions based on their experience are invaluable.

Secondly accommodation decision making involves matching students’ needs with ways and means of accommodations. Once information is collected about the student with a learning disability, the next step is to weight the options. The teacher needs to make the best choice using stated policy and guidelines. He should communicate to students with learning disabilities the option that are “doable” and available to them. And finally he should resolve disputes between certain requests and feasibility of accommodating request.

Thirdly, accommodation decision making process involves implementing the accommodation plan. A “contract” or plan of action should be developed between the student and the teacher or appropriate staff person. Write up the accommodation plan that includes the answer to the questions. What types of accommodations will be provided? How they will be executive? Under what conditions will the accommodation are provided? How will the accommodation plan be evaluated: Is it successful?

The step that follows the implementation of the accommodation plan is evaluating outcomes of accommodations. It is important to evaluate the plan during and after implementation. In this regard, students and faculty should provide suggestions; the suggestions should be negotiated to make the plan more effective. Evaluation of outcomes is important to determine a future course of action.

Finally, there is need to utilize the outcome of the evaluation. This is for the purpose of determining if the plan was not effective, how would it be improved? What changes need to be made? Accommodation in special needs education is therefore necessary for meaningful teaching-learning as well in the inclusion of individuals with special needs in schools and society in general.

**Benefits of Accommodation for Special Needs Children**

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Consider accommodations in light of a student's access to instruction across all subject areas. It is important to get each student's input about familiar and comfortable accommodations, and ask what the student thinks would be most helpful. Teachers and other members of each student's IEP team should have information about the way the student learns best, and types of accommodations that the student finds helpful on classroom assignments and during previous testing. If this information is not readily available, it may be helpful to work with a student prior to his or her IEP meeting and try out a variety of accommodations in the classroom in order to figure out what works well. Here are some considerations in the selection of accommodations:

1. increased access to learning
2. promotion of student independence
3. use across environments and tasks
4. technological features like software and compatibility with other devices
5. ease of use (set-up, operation)

**Conclusion**

Accommodation as a form of adaptation is indispensable as far as special needs education is concerned. Considering the fact that special needs education is all about individuals who present atypical educational needs and characteristics, teachers must make deliberate efforts to ensure that individuals or learners with special needs in their custody are provided accommodations that suit their needs, to enable them fit into the learning environment as well as learn. Government and Non-governmental agencies should as a matter of concern work towards the provision of various accommodations in public schools to ensure that child that such children with special needs are not denied their right to education.

**Recommendations**

* Teachers and parents decides which supplementary aids and services a child needs to support his or her access to and participation in the school environment.
* The IEP team must really work together to make sure that a child gets supplementary aids and services that he or she needs to be successful.
* IEP team members talk about the child’s needs, the curriculum, and school routine, and openly explore all options to make sure the right supports for the specific child are included.
* Collaboration/consultation among staff, parents, and/or other professionals
* Adapted materials – such as books on tape, large print or highlighted notes should be provided to children with special needs by governments from various levels and spirited individuals. .

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**BEST PRACTICES IN INSTRUCTIONAL DELIVERY OF BUSINESS EDUCATION AND CHALLENGES FOR NATIONAL DEVELOPMENT IN FEDERAL UNIVERSITIES SOUTH SOUTH, NIGERIA**

**BY**

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**Abstract**

*This study explores best practices in instructional delivery of business education and challenges for national development in federal universities South South, Nigeria. To achieve this purpose, two research questions and two null hypotheses guided the study. The descriptive survey research design was adopted for the study. The population for the study was 207 made up of 60 Business Education lecturers and 147 final year business education students in 2017/2018 academic session. The sample size for the study was 40 which was purposively drawn from the University of Uyo. The instrument for data collection was the researchers’ structured questionnaire titled, ‘Best Practices in Instructional Delivery of Business Education and Challenges Questionnaire’ (BIDBEC). The questionnaire was face validated by three experts. The reliability coefficient value of .07 was obtained in a trial testing using Cronbach Alpha statistical tool. Data were analysed using mean and standard deviation for research questions, while the t-test statistic was used to test the null hypotheses at .05 level of significance. Findings among others revealed that the matching of theory with practice and application of ICT media to classroom learning were some of the best practices in instructional delivery of business education for national development in South South, Nigeria. The use of unskilled lecturers and poor exposure of students to practical training were some of the challenges in instructional delivery of business education. It was recommended based on the findings, that more time should be allotted to matching theory with practice in order to meet international best practices among others.*

**Key words:** Best practices, instructional delivery, business education, national development

**Introduction**

In a growing nation like Nigeria, the quest for acquisition of skills relevant to national building has attracted concerns by educational practitioners and other scholars. This quest may not have been unconnected with government’s interest and regard for education as an instrument for national development. This education is seen as a pathway that equips the citizenry with knowledge, attitudes, values, skills and competencies required to build a society that is stable, socially and economically strong to guarantee individuals well-being. One of such educational programme is business education. Business education, according to Osuala (2009), is a programme of instruction which consists of two parts; (a) office education, a vocational education programme for office career through initial refresher and upgrading education leading to employability in advancement in office education, and (b) general education; a programme to provide students with information and competencies needed by all in managing personal and business affairs and in using the services of the business world. This definition suggests that business education is a composition of two broad areas namely office education and general business education which are geared towards providing the needs of individuals and that of the society.

The provision of needs of individuals infers that a continuous review of its best practices in instructional delivery are in tone with societal demands. Thus, the acquisition, development and inculcation of proper value-orientation for the survival of individual and the society; development of the intellectual capacities of individual to understand and appreciate the environment, acquisition of both physical and intellectual skills which enable individual to develop into useful members of the society are the objectives of business education (Aliyu, 2006). These objectives basically address needs of individual in striving for development in different dimensions. On the other hand, the application of best instructional delivery techniques is to improve the quality of students learning, stimulate faculty intellectual growth and enhance overall productivity. The application of the right techniques with the integration of needs is aimed at achieving best practices in business education programme.

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Best practices are inherent parts of a curriculum that establishes a connection and relevance identified in educational research. According to Florida Department of Education as cited in Oviawe, Uwameije & Uddin (2017), best practices are new or refined programmes relevant to academic affairs, students affairs, work force education, economic development, educational technology, innovation entrepreneurship and administration. The wide coverage of a programme using best practices implies that best practices motivate, engage and prompt students to learn and achieve, possess the knowledge, skills and capabilities in line with international standards required to be useful to themselves and the society.

With regard to international best practices which is innovative in approach, theories are matched with practical to achieve desired objectives. Some of these practices include application of ICT media to classroom learning, individualised learning for self-competence, application of suitable techniques and methods of delivery, group learning for effective assimilation and practical learning for effective skills acquisition. Drucker (2010) observed that knowledge workers are now needed by knowledge organisations that operate in knowledge economy. The implication of Drucker’s observation is that, acquisition of knowledge has gradually shifted from rote learning to practical skills acquisition which is the focus of international best practices. In a similar vein, Oliver (2008) indicated that in modern offices and organisations that operate with e-office processes, only workers who possess electronic office operation skills will remain relevant. This view recognises the incorporation of new skills in a dynamic society characterised with technology. Aworanti (2015), explained that most vocational education curricula are oblivion having been in use for over 15 years.

The oblivion state of these curricula has created a huge gap between business education and industries in Nigeria. No wonder, Majumadar (2011) remarked that the challenges on how to develop curriculum and training programme that will help to respond to the skills needed by industries seems to be a common concern. The views by Aworanti (2015) and Majumdar (2011) are the reflection of the use of traditional delivery method in business education, such as talk-chalk board method or lecture method. It is as a result of the traditional use of instructional delivery that the image of business education both in classroom and labour market is devalued (Edokpolor & Egbiri, 2007). A study by Oviawe, Uwameiye & Uddin (2017), revealed that there were almost no joint programme in technical education between schools and industries, except for the Students Industry Work Experience Scheme (SIWES) among others. This invariably suggests the presence of little or no relationship between vocational programme and labour market.

The relationship between learning in the classroom and labour market needs is not unconnected with the fact that effective business education delivery will equip the learners with skills required to be employable in the ever-changing society. No wonder Usoro (2016), averred that skills acquired through business education has been found very important to developing the power of reasoning and judgment, and generally of preparing oneself or others intellectually for mature life. Regrettably, a study by Edokpolor & Owenvbiugie (2017), revealed that business education is faced with various challenges for achieving national development. This is also true as Olori & Olori (2018) in a study, among others, revealed unsuitable skills for learners, inadequate facilities and poor funding of programmes as some of the challenges in empowering youth through Technical Vocational Education and Training (TVET). The above studies by Edokpodor & Owenvbiugie, Olori & Olori indicate that there is a direct relationship between best practices in business education delivery and national development.

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National development is a process of reconstruction and transformation of various facets of a nation. It is the full growth and expansion of industries, among others. This development recognises improvement through planned national economy, increased agricultural production through application to modern technical know-how, harnessing industrial production; improvement of human resource; application of science and technology in production sector as well as provision of mass education (Bawa, 2018). Olori & Olori (2018), added that it involves the integration or application of skills, knowledge competencies of individuals in improving the quality of life within the socio-milieu. This acquisition of skills for individual or societal development is one of the objectives of business education. Thus, Asuquo (2016), posited that business education programme is vocational programme intended to fill the gap between knowledge and practice by engaging the trainee with the various requisite knowledge, skills and attitude for a successful career in occupation, teaching and entrepreneurship. The tripartite features in this definition reflect the goal of business education in achieving national development.

Interestingly, the above tripartite attributes of business education which are office management, teaching and entrepreneurship are all performed by business education practitioners. These practitioners comprised business education lecturers, equipped with pedagogical skills to effectively deliver business education lessons, and students who are recipients of the lessons, and are trained to be successful managers, teachers and entrepreneurs. These students as relate to this study are final year business education students of 2017/2018 academic session. The choice of this level of students is premised on the fact that they are exposed to business related courses, designed to equipping them with skills and knowledge for self and national development. Unfortunately, in South South, Nigeria, there is a wide spread of unemployed graduates among which are graduates of business education in search of white collar jobs. Rather than contributing to national economy, some of the graduates are unproductive. This unproductive state of these graduates has attracted concern by scholars over the practices of business education instructional delivery for national development. Hence, this study attempts to investigate the best practices in instructional delivery of business education and challenges for national development in federal universities in South South, Nigeria.

The purpose of the study therefore was to determine the best practices in instructional delivery of business education and challenges for national development in federal universities in South South, Nigeria. The objectives of the study were to determine the:

1. best practices in instructional delivery of business education for national development.

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1. challenges in instructional delivery of business education.

The following research questions guided the study

1. What are the best practices in instructional delivery of business education for national development?
2. What are the challenges in instructional delivery of business education?

The following null hypotheses were formulated for the study and tested at .05 level of significance.

**Ho1:**  There is no significant difference between the mean ratings of business education lecturers and their final year students on the best practices in instructional delivery of business education for national development.

**Ho2:** There is no significant difference between the mean ratings of business education lecturers and their final year students on the challenges in instructional delivery of business education.

**Methodology**

The study adopted a descriptive survey research design with a population of 207 made up of 60 business education lecturers and 147 final year students of business education students from the three federal Universities offering Business Education in South South, Nigeria. This comprised 16 lecturers and 24 students from the University of Uyo, 20 lecturers and 88 students from the University of Calabar, and 24 lecturers and 35 students from the University of Benin. The purposive sampling technique was used to select the University of Uyo as the sample for the study. The instrument for data collection was the researchers’ structured questionnaire titled, ‘Best Practices in Instructional Delivery of Business Education and Challenges Questionnaire’ (BIDBEC). The questionnaire contained 10 items in a cluster of two, designed on a 4-point scale of strongly agree, agree, disagree and strongly disagree with assigned scale of 4-1.

The questionnaire was face-validated by three experts two from vocational education, one from educational foundations, guidance and counseling all from the University of Uyo, Akwa Ibom. The reliability coefficient of 0.79 was obtained using Cronbach Alpha statistical tool. Data collected from respondents were analysed using mean and standard deviation for research questions. The criterion mean of 2.50 was used as decision rule for accepting items. Items with mean score below 2.50 were rejected. The t-test statistic was used to test the null hypotheses at .05 level of significance. Where the p -value is less than .05 level of significance, significant difference was found, implying that the null hypothesis was rejected. However, significant difference was not found where the p-value was greater than .05 level of significance, implying that the null hypothesis not rejected.

**Results**

**Table 1:** Mean and standard deviation of respondents on best practices in instructional delivery of business education for national development

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Lecturers (n=14)** | | | **Students (n=21)** | | |
| **S/N** | **Items** |  | **SD** | **Remark** |  | **SD** | **Remark** |
| 1. | Matching theory with practice | 3.14 | .54 | Agree | 3.19 | .40 | Agree |
| 2 | Application of ICT media to classroom learning. | 2.64 | 1.01 | Agree | 2.71 | .90 | Agree |
| 3 | Techniques and methods for instructional delivery. | 2.86 | .77 | Agree | 3.05 | .74 | Agree |
| 4  ***Effiong E. Asuquo & Gloria I. Olori*** | Practical learning for effective skill acquisition. | 3.21 | .70 | Agree | 3.14 | .66 | Agree |
| 5 | Effective supervisor of students SIWES | 2.93 | .62 | Agree | 2.86 | .57 | Agree |
|  | **Cluster mean** | **2.96** | **.73** | **Agree** | **2.99** | **.65** | **Agree** |

The above Table showed the mean scores of agree for lecturers as 3.14, 2.64, 2.86, 3.21 and 2.93 for items 1-5, while the standard deviation ranged from .54 – 1.01. Furthermore, items 1, 2, 3, 4, and 5 had mean scores of agree for students as 3.19, 2.17, 3.05, 3.14, and 2.86; and corresponding standard deviation as .40, .90, .74, .66, and .57. The cluster mean of 2.96 for lecturers and 2.99 for students revealed that matching theory with practice, the use of ICT media to classroom learning, techniques and methods for instructional delivery, practical learning for effective skill acquisition and effective supervision of students SIWES were some of the best practices in instructional delivery of business education for national development in South South, Nigeria.

**Table 2:** Mean and standard deviation of respondents on challenges in instructional delivery of business education

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Lecturers (n=14)** | | | **Students (n=21)** | | |
| **S/N** | **Items** |  | **SD** | **Remark** |  | **SD** | **Remark** |
| 6 | Poor funding of business education | 3.00 | .79 | Agree | 3.05 | .74 | Agree |
| 7 | Inadequate facilities for practical learning. | 3.14 | .66 | Agree | 2.88 | .85 | Agree |
| 8 | Unskilled lecturers for lesson delivery. | 2.86 | .86 | Agree | 2.67 | .80 | Agree |
| 9 | Poor delivery techniques. | 2.43 | 1.02 | Disagree | 2.67 | .66 | Agree |
| 10 | Poor exposure of lecturers to practice training. | 2.79 | .58 | Agree | 2.81 | .60 | Agree |
|  | **Cluster mean** | **2.84** | **.78** | **Agree** | **2.82** | **.73** | **Agree** |

Table 2 showed the mean ratings of agree for lecturers in items 6(3.00), 7(3.14), 8(2.86) and 10 (2.79), while item 9 had the mean score of disagree (2.43); and the standard deviation of .79, .66, .86, 1.02 and .58. The Table further indicated that students had the mean scores of agree on all the items as 3.05, 2.88, 2.67, 2.67 and 2.81 with corresponding standard deviation of .74, .85, .80, .66 and .06. With the cluster mean of 2.84 for lecturers and 2.82 for students above the criteria mean for accepting an item, the Table therefore revealed that poor funding of business education programme, inadequate facilities for practical learning, unskilled lecturers and lecturers poor exposure of students to practical training were some of the challenges in instructional delivery of business education.

**Table 3**: t-test analysis of significant difference between the mean ratings of respondents on best practices in instructional delivery of business education for national development

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Lecturers (n=14) Students (n=21)** | | | | | |
| **S/N** | **Items** |  | **SD1** |  | **SD2** | **Pvalue** | **Decision** |
| 1. | Matching theory with practice | 3.14 | .54 | 3.19 | .40 | .58 | NS |
| 2 | Application of ICT media to classroom learning. | 2.64 | 1.01 | 2.71 | .90 | .56 | NS |
| 3 | Techniques and methods for instructional delivery. | 2.86 | .77 | 3.05 | .74 | .78 | NS |
| 4 | Practical learning for effective skill acquisition. | 3.21 | .70 | 3.14 | .66 | .62 | NS |
| 5 | Effective supervisor of students SIWE | 2.93 | .62 | 2.86 | .57 | .94 | NS |

Table 3 revealed that Pvalues for item 1-5 were greater than .05 level of significance. This implied that the null hypotheses were not rejected.

**Table 4: t**-test analysis of significant difference between the mean ratings of respondents on challenges in instructional delivery of business education

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|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Lecturers (n=14) Students (n=21)** | | | | | |
| **S/N** | **Items** |  | **SD1** |  | **SD2** | **Pvalue** | **Decision** |
| 6 | Poor funding of business education | 3.00 | .79 | 3.05 | .74 | .88 | NS |
| 7 | Inadequate facilities for practical learning. | 3.14 | .66 | 2.88 | .85 | .29 | NS |
| 8 | Unskilled lecturers for lesson delivery. | 2.86 | .86 | 2.67 | .80 | .84 | NS |
| 9 | Poor delivery techniques. | 2.43 | 1.02 | 2.67 | .66 | .03 | NS |
| 10 | Poor exposure of lecturers to practice training. | 2.79 | .58 | 2.81 | .60 | .91 | NS |

Table 4 indicated that p-values for items 6,7, 8 and 10 are .88, .29, .84 and .91 are greater than .05 level of significance, hence the non-rejection of the null hypothesis. The Table further revealed that Pvalue for item 9 was less than .05 level of significance, hence the rejection of the null hypothesis.

**Best practices in instructional delivery of business education and national development**

In research question one, findings revealed that five best practices in instructional delivery of business education were required for national development in South South, Nigeria. Respondents indicated that matching of theory with practice through the application of ICT media in classroom teaching was identified as one of these practices in the instructional delivery of business education. This is not unconnected with the fact that the acquisition of skills which business education offers should equip the recipients to fit in the world of work. This is also true as the findings of Oviawe, Uwameiye & Uddin (2017) revealed that there were almost no joint programme in technical education between schools and industries, except for the students industrial work experience scheme (SIWES) among others. This is not surprising since practical learning for effective skill acquisition was seen as one of the best practices. Asuguo (2016) gave credence to this idea when he asserted that business education programme is a vocational education programme intended to fill the gap between knowledge and practice by engaging the trainee with the various requisite knowledge, skills and attitude for a successful career in occupation. The importance of best practices in instructional delivery of business education is shared by both business education lecturers and final year students on having similar views regarding the attainment of national development in the null hypothesis.

**Challenges in instructional delivery of business education**

Findings from research question two showed that instructional delivery of business education is faced with several challenges in South South, Nigeria. Prominent among these challenges were poor funding of business education programme and the involvement of unskilled lecturers in lesson delivery. Funding is evident on the inadequacy of facilities for practical learning. This constitutes a challenge in the realisation of national development since business education is said to perform tripartite functions in the area of career occupation, teaching and entrepreneurship. The finding is supported by the findings of Olori & Olori (2018) that inadequate facilities and poor funding of programme constitute some of the challenges in empowering youth through technical vocational education and training. With regard to poor exposure of students to practical training, respondents also revealed that it was seen as a challenge in instructional delivery of business education. This may not be surprising since lesson delivery is associated with poor delivery techniques. Hence, Edokpolor & Owenvbiugie (2017) in a study revealed that business education is faced with various challenges for achieving national development. These challenges are also shared by both respondents in the null hypothesis following its acceptance.

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**Conclusion**

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The study concluded that matching of theory with practice and the integration of ICT media into classroom learning were some best practices in instructional delivery of business education for national development in South South, Nigeria. Problem associated with instructional delivery of business education in South South Nigeria were poor funding, the use of unskilled lecturers for lesson delivery as well as poor exposure of students to practical trainings.

**Recommendations**

Based on the findings of the study, the following recommendations were made.

1. Government through the ministry of education should release more funds for the purchase of more instructional facilities in business education.
2. Government through the policy making body should review the existing curriculum of business education to accommodate more time in matching theory with practice.
3. Students should be exposed to practical training through allotting more time by school management for practical related courses.
4. Business education lecturers should be encouraged by management to undertake professional training to expose them on modern techniques for lesson delivery.

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**TECHNOLOGY INTEGRATED PEDAGOGY IN TECHNICAL EDUCATION DELIVERY THE JOURNEY SO FAR: CASE STUDY OF FEDERAL COLLEGES OF EDUCATION (TECHNICAL) POTISKUM AND GOMBE**

**BY**

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**Abstract**

*This study examined Technology Integrated Pedagogy (TIP) in technical education delivery. The study was conducted in Federal Colleges of Education (Technical) (FCE (Tech.) Potiskum and Gombe. The design of the study was a survey. The instrument for data collection was a structured questionnaire with four points rating scale. The population for the study consisted of 96 lecturers. Purposive sampling techniques was used to draw 48lecturers that are using WhatsApp on social media. WhatsApp social media platform was used for the distribution and collection of data. The study has three specific objectives to achieved and three research questions raised and three null hypotheses formulated to guide the study. The data collected was analysis using SPSS. Mean and standard deviation was used to answer the research questions, whilet-test was used to test the null hypotheses at 0.05 level of significance. The findings of the study revealed that TIP has not been integrated in the delivery of technical education, inadequate TIP infrastructural facilities, curriculum not directed for TIP among others. The study concluded that lecturers should strived to integrate TIP, infrastructures for TIP should be provide and curriculum planners should incorporate TIP in the curriculum.*

**Key Words:** Technology, Integrated, Delivery

**Introduction**

The integration of Information and Communication and Technology (ICT) in education in Nigeria was traced back tomid-1960s when International Business Machines (IBM) and Federal Government of Nigeria (FGN) collaborated and set up computer centres in some Universities (Nwezeh, 2010; Nyenwe&Ishikaku, 2012). These universities include university of Ibadan, University of Lagos, Akoka; Obafemi Awolowo University, Ile-Ife; University of Nigeria, Nsukka; and Ahmadu Bello University, Zaria. According to Joy Nyenwe and Ishikaku (2012) these computer centres letter became Manpower Development Centres (MDC). The MDCs were affected by Nigerian civil war. The introducing of computer education in secondary education was conceived during the 32nd meeting of the National Council on Education (NCE) of Nigeria, in 1987 where several other measures and initiatives have been taken to development ICT in Nigerian education system (Thomas & Oladejo, 2017). This led to the implementation of ICT Policy on April 18, 2001, the establishment of NITDA (National Information Technology Development Agency), establishment of Nigerian Policy for Information Technology (NPIT) by the Nigeria Information and Communication Technology Agency (NICTA). Accordingly, the National Information Technology Development Fund (NITDEF) was established; by August 7, 2004, National Information and Communication Technologies Strategic Action Plan Committee (NICTSAPC) was inaugurated by the Federal Government of Nigeria. Their report led to incorporation of ICT in the current National Policy on Education in 2013 (Omale&Ibietan, 2013).

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The potentials of Information and Communication and Technology(ICT) and the emerging innovative technologies offers by ICT has revolutionized the way and manner in which people teach and learn (Oakley, 2008). Integrating internet technology in teaching and learning drives most exciting innovations in educational sector. The increasing usage of internet and other innovative technologies have pave ways for new means of educational delivery (Wilfred, 2016). Internet technology plays a major role in the achievement of global knowledge and skills dissemination. The internet provides web-based acquisition, sharing, storage, retrieval and feedback of information.

United Nations Educational, Scientific, and Cultural Organization (UNESCO), 2008) stresses that the adoption of technologies in curriculum delivery has direct and indirect impact on the social-economic development; noting that emerging TIP are perceived as a catalyst for change in teaching and learning. Use of the technologies in the normal subject-based classroom settings, benefits the learners as they are able to learn the technological skill with real tasks (Watson, 2001). The internet removes barriers that prevent educators’ and learners’ access to information and the pace of learning (Chigona, Chigona&Davids, 2014).The use of TIP innovations in schools and colleges enhance teaching and learning practices, and also prepare students for the 21st century workplace where ICTs are becoming more and more important (Kozma, 2005). Integration of TIP in the curriculum delivery encourages constructive learning in a manner that thinking ability such as reasoning, understanding and creativity of the learners’ can be developed in a more efficient way as compare to traditional teaching practices (Bester & Brand, 2013; Keong, Horani& Daniel, 2005). Study showed that comprehension and problem solving are better learnt using interactive media, hence necessitating the integration of ICT into teaching and learning processes (Department of Education,2004). The enormous potentials of emerging TIP have aids teaching and learning by providing new possibilities for learners to develop cognitive skills, critical thinking skills and information accessing and dissemination skills, evaluation and synthesising skills in the most effective way (Wilfred, 2016; UNESCO, 2008).

Chigona, Chigona and Davids (2014) submitted that technology is used to help create learning environments and support for learning that are ideal as opposed to traditional methods of learning. Accordingly, TIP provides fast and accurate feedback to learners. According to Newhouse (2002) ICT-supported learning environments is good for the constructivist teaching approach. It was stressed that one of the most important components of the constructivism theory of learning is the concept of proximal learning, which purports that the learner constructs his/her own knowledge for which scaffolding is initially required (Özdemir, 2017). This scaffolding is easily provided by computer applications in TIP learning environment.

Federal College of Education (Technical)are saddled with the responsibility train and develop quality teachers who will translate their technical skills and knowledge to learners for gainful employment there by contributing to national economic development (FRN, 2013). Owing to this fact, the universities ought to experience high standards in the quality of facilities, resources and services delivery (Akpoiroro &Okon, 2015). To this end, there is an ongoing emphasis in higher education on deeper learning approaches that engages students in critical thinking, problem-solving, collaboration, and self-directed learning (NMC, 2017). For students to remain motivated, they need to be able to make clear connections between their coursework and the real world, and how the new knowledge and skills will impact them. As the enabling role of technologies for learning crystalizes, instructors are leveraging these tools to relate materials and assignments to real-life applications.

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The concept of Technology Integrated Pedagogy (TIP) connotes the used of ICT to enhance teaching and learning. Technology integrated is an educational service delivery platform in which teaching and learning is integrated with ICT supported elements that makes teaching and learning simpler and virtually real (Ghavifekr, AbdRazak, Ghani, Ran, Meixi, &Tengyue, 2014). It involves the use ICT concepts to design, produce, store, retrieved and share educational instructions for teaching and learning (Wilfred, 2016). TIP require ICT both software applications and hardware components that are used together create learning physical and virtual learning environment. The TIP elements includes the internet that interconnects the world wide web where applications on such as google scholar, google classroom, google presentation, learning management system etc are accessed and subscribe for educational used (Ghavifekr & Rosdy, 2015).Other physical elements of TIP that uses software applications to aid teaching and learning includes computers, smartboards, multimedia projector, interactive boards among others. Three or elements might be blended together produce a specific instruction and evaluation of learners as well. The benefits of integration of TIP in academic institutions is indispensable. Hence, educational curriculum of our time must navigate between physical and virtual concept of teaching and learning by incorporating instructional techniques and materials to fit in TIP learning environment.

Teaching and learning need to be delivered in most effective way. Relaying on lecture and project based teaching methods for teaching and learning in most Colleges of education in Nigeria must undergo transformations to meet effective and efficient educational service delivery in the 21stcentury.Consequently, the researchers want to investigate the integration of the emerging innovations in technology education delivery in Federal Colleges of Education (Technical) of Gombe and Potiskum in North East Nigeria.

**Purpose of the Study**

 The purpose of the study was to determine the Technology Integrated Pedagogy (TIP) in technical education delivery in FCE (Tech.) Potiskum and Gombe. Specifically, the study determined:

1. the infrastructure of TIP in (FCE Tech.)
2. the TIP used by lecturers in teaching and learning, and
3. the challenges encounter by lecturers of FCE (Tech.)on the use of TIP in teaching and learning.

**Research Questions**

1. What technology integrated pedagogy infrastructure available in delivering technical education in FCE (Tech.)?
2. What are the TIP used by lecturers in delivering technical education in FCE (Tech.)?
3. Whatare the challenges faced by lecturerson the use of TIPin delivering technical education in FCE (Tech.)?

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**Hypotheses**

**Ho1:**There is no significance difference between the mean responses of lecturers in FCE (Tech.) Potiskum and Gombe on availability of FCE (Tech.) infrastructure for delivering technical education.

**Ho2:**There is no significance difference between the mean responses of lecturers in FCE (Tech.) Potiskum and Gombe on integrating TIP in delivering technical education.

**Ho3:** There is no significance difference between the mean responses of lecturers in FCE (Tech.) Potiskum and Gombe on challenges they encounter with TIP in delivering technical education.

**Methodology**

The design of the study was a survey. Sources available from the (FCE) Tech Potiskum and Gombe indicated that the population of study consisted of 96 lecturers. Forty-six from FCE (Tech.) Gombe and 50 others from FCE (Tech) Damaturu. Purposive sampling techniques was used to draw lecturers that are using WhatsApp social media. In doing that the researchers were able to conveniently sample 48 lecturers: 25 from FCEs (Tech) Potiskum and 23 from FCEs (Tech) Gombe. The instrument for data collection was a four-point structured questionnaire with 33 items, designed by the researchers and tagged “Innovative Technology Integrated Pedagogy for Technical Education Delivery (ITIPTED). Section A of the questionnaire sort personal information, while section B sort information on Technology Integrated Pedagogy for teaching and learning. Likewise, section C and D sort information on Technology Integrated pedagogy infrastructure in the school and Challenges faced by lecturers on the use of technology integrated pedagogy respectively.

The researchers share the questionnaire via WhatsApp platform and collected them within two weeks of sharing. Data obtained from the questionnaire were run on Statistic Package for Social Sciences (SPSS). Mean obtained was used to answer the research questions, while t-test was used to test the null hypotheses at 0.05 level of significant. The decision rule taken by the researchers on the means was 2.50 and above as accepted, while items below the mean of 2.50 was rejected. While, when P-value (Significant value) is less than the significant of 0.05 the null hypothesis is to be rejected, otherwise the null hypothesis is to be accepted. Three experts from the department of technology education Abubakar Tafawa Belewa University Bauchi and ModibboAdama University of Technology Yola validated the instrument. The instrument was tested on 10 lecturers of university of technology Minna. The reliability of the instrument was found to be 0.78 using Cronbach Alpha.

**Research Question 1**: What technology integrated pedagogy infrastructure available in delivering technical education in FCE (Tech.)?

Table 1: Technology Integrated pedagogy infrastructure

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** | **LFCETG** | | **LFCETP** | | X**G N=48** | **SDG** | **tvalue** | **Pvalue** | **Decision** |
| X**G** | **SDG** | X**G** | **SDG** |
| 1 | Audio-visual studio | 1.00 | 0.02 | 1.00 | 0.90 | 1.00 | 0.04 | 2.787 | 0.110 | NS |
| 2 | Computers/laptops in the classrooms | 2.52 | 0.51 | 2.96 | 0.2 | 2.75 | 0.44 | 3.852 | 0.100 | NS |
| 3  ***Suleidaya, Cyril, Gwanabawa, Wilfred & Jidda*** | Interactive board in the classrooms | 1.25 | 0.51 | 1.48 | 0.51 | 1.50 | 0.51 | 0.283 | 0.778 | NS |
| 4 | Internet connection to school for use by lecturers and students | 3.00 | 0.10 | 3.00 | 0.5 | 3.00 | 0.30 | 6.794 | 0.120 | NS |
| 5 | Projector in the classrooms | 2.52 | 0.52 | 1.52 | 0.51 | 2.00 | 0.51 | 6.743 | 0.056 | NS |
|  |  |  |  |  |  |  |  |  |  |  |
| 6 | Smartboard in the classrooms | 1.52 | 0.49 | 1.00 | 0 | 1.25 | 0.43 | 4.899 | 0.130 | NS |
| 7 | Technology integrated pedagogy applications/Software for Teaching and learning | 2.00 | 0 | 1.52 | 0.51 | 1.75 | 0.44 | 4.707 | 0.230 | NS |
| 8 | Regular Electricity | 2.51 | 0.51 | 2.00 | 1.00 | 2.25 | 0.84 | 2.303 | 0.270 | NS |

**Key:** LFCETG = Lecturers FCE (Tech) Gombe, LFCETP = Lecturers FCE (Tech) Potiskum

XG = Grand mean, SDG = Grand standard deviation, N = Sample size

The analysis presented on Table 1above shows that computer/laptops and internet(item 2 and 4) has mean responses of 2.75 and 3.00 by lecturers from FEC (Tech) Gombe and Potiskum respectively. The mean of these two items are above the cut-up point of 2.5, signifying the availability of the items in FCE (Tech.). While, other items were not available in FCE (Tech), as the mean opinion of the respondents ranges from 1.00 to 1.75 which were not up to 2.5. The standard deviation of the analysis has also shown that the mean of the respondents were close to the group mean and to the opinion of each other.Also, the test of the null hypothesis with regard to the mean responses of the groups, indicated that at 46 degree of freedom at 0.05 level significance, all the items presented on the table shown non-significant, since all the p-values were greater than the probability value of 0.05.Hence, must of the technology integrated pedagogy infrastructure are not available to for the delivery of technical education.

**Research Question 2:**What are the TIP used by lecturers in delivering technical education in FCE (Tech.)?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** | **LFCETG** | | **LFCETP** | | X**G N=48** | **SDG** | **tvalue** | **Pvalue** | **Decision** |
| X**G** | **SDG** | X**G** | **SDG** |
| 1 | Adaptive learning technologies | 1.52 | 0.51 | 1.20 | 0.41 | 1.35 | 0.48 | 2.398 | 0.21 | NS |
| 2 | Artificial intelligent | 1.52 | 0.51 | 1.10 | 0.1 | 1.31 | 0.47 | 3.202 | 0.300 | NS |
| 3 | Game-based learning | 1.51 | 0.57 | 1.25 | 2.61 | 1.60 | 1.90 | 0.297 | 0.769 | NS |
| 4 | Google classroom | 1.52 | 0.52 | 1.00 | 0.51 | 1.25 | 0.43 | 1.098 | 0.278 | NS |
| 5 | Google presentation | 1.52 | 0.51 | 1.32 | 0.51 | 1.42 | 0.65 | 0.437 | 0.664 | NS |
| 6 | Google scholar | 1.25 | 0.51 | 1.51 | 0.51 | 1.25 | 0.43 | 1.081 | 0.691 | NS |
| 7 | Interactive board | 1.52 | 0.53 | 1.52 | 0.51 | 1.25 | 0.4 | 1.098 | 0.278 | NS |
| 8 | Interactive multimedia | 1.53 | 0.51 | 1.32 | 0.87 | 1.42 | 0.65 | 1.081 | 0.285 | NS |
| 9 | Internet of a thing (IoT) | 1.49 | 0.84 | 1.48 | 0.87 | 1.48 | 0.85 | 0.007 | 0.994 | NS |
| 10 | Learning management system (LMS) | 1.39 | 0.72 | 1.24 | 0.66 | 1.31 | 0.70 | 0.754 | 0.455 | NS |
| 11 | Mobile technology | 1.00 | 0.09 | 1.01 | 0.01 | 1.00 | 0.08 | 0.401 | 0.679 | NS |
| 12 | Natural user interface | 1.61 | 0.84 | 1.20 | 0.65 | 1.34 | 0.76 | 1.880 | 0.067 | NS |
| 13 | PowerPoint presentation | 2.48 | 0.51 | 2.52 | 0.51 | 2.50 | 0.10 | 0.283 | 0.778 | NS |
| 14 | Smartboard | 1.48 | 0.50 | 2.00 | 0.03 | 1.81 | 0.73 | 0.339 | 0.624 | NS |
| 15 | Youtube presentation | 1.39 | 0.72 | 1.01 | 0.06 | 1.19 | 0.53 | 2.598 | 0.391 | NS |

**Key:**LFCETG = Lecturers FCE (Tech) Gombe, LFCETP = Lecturers FCE (Tech) Potiskum

XG = Grand mean, SDG = Grand standard deviation, N = Sample size

The analysis presented on Table 2 indicated technology integrated pedagogy used in teaching and learning. Based on this analysis, only item 13 - power point presentation is the TIP being integrated in technical education delivery in FCEs (Tech.)Gombe and Potiskum respectively. This was because, the item has a mean of 2.50 equal to the cut-up point of 2.5 and 0.51 standard deviation. However, the remaining 14 itemswere not integrated lecturers as their mean scores were within the range of 1.00 to 1.60 in in delivery of technical education in the respective FCEs (Tech). Furthermore, mean of the group when tested at 46 degree of freedom and 0.05 level of significant proved non-significant in each case as all the p-values were greater than the probability value of 0.05.This mean, the opinion of the groups does not differ statistically from each other. Hence, from the foregoing, it is obvious to say that technology integrated pedagogy is not integrated in teaching and learning in Federal colleges of education under the study.

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**Research Question 3**: What are the challenges encounter by lecturers in delivering technical education in colleges of education?

Table 3: Challenges faced by lecturers on the use of technology integrated pedagogy

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Item Statement** | **LFCETG** | | **LFCETP** | | X**G N=48** | **SDG** | **tvalue** | **Pvalue** | **Decision** |
| X**G** | **SDG** | X**G** | **SDG** |
| 1 | Strong internet network connection | 3.35 | 1.07 | 3.52 | 0.51 | 3.50 | 0.68 | 0.702 | 0.488 | NS |
| 2 | Smart boards fixed in lecture rooms | 2.565 | 0.992 | 3.280 | 1.173 | 2.70 | 1.02 | 2.885 | 0.270 | NS |
| 3 | Available software/application for teaching and learning | 3.000 | 0.01 | 3.320 | 1.145 | 3.25 | 0.27 | 1.398 | 0.175 | NS |
|  | ***Incompetent teacher's lecturers ability to integration ICT for teaching and learning*** |  |  |  |  |  |  |  |  |  |
| 4 | Lecturers are incompetent to use educational technology applications       for teaching and learning. | 2.793 | 0.751 | 2.080 | 0.862 | 3.25 | 1.57 | 2.828 | 0.007 | S |
| 5 | Lecturers are not conversant with the use of smart board for teaching and learning | 3.487 | 0.511 | 3.040 | 0.200 | 2.75 | 0.25 | 3.852 | 3.750 | NS |
| 6 | Lecturers not interact with students on social media to aids teaching and learning | 3.000 | 0.001 | 3.360 | 0.638 | 3.02 | 0.30 | 2.823 | 0.090 | NS |
|  | ***Curriculum is not directed to ICT integrated instruction*** |  |  |  |  |  |  |  |  |  |
| 7 | Current curricula not ICT directed | 3.522 | 0.511 | 2.960 | 0.539 | 3.52 | 0.47 | 3.709 | 3.700 | NS |
| 8 | Curriculum provides no link to e-books and other ICT learning resources | 3.480 | 0.520 | 3.480 | 0.509 | 3.55 | 0.48 | 0.283 | 0.778 | NS |
| 9 | Textbooks not compatible with the smart and interactive boards | 3.478 | 0.846 | 3.200 | 0.502 | 3.75 | 0.71 | 0.205 | 0.839 | NS |
|  | | | | | | 3.61 | 0.55 | 1.399 | 1.772 | NS |

**Key:**LFCETG = Lecturers FCE (Tech) Gombe, LFCETP = Lecturers FCE (Tech) Potiskum

XG = Grand mean, SDG = Grand standard deviation, N = Sample size

The analysis presented on Table 3 revealed that all items present were agreed upon by all the respondents as challenges faced by lecturers of FCE (Tech) Gombe and Potiskum in their quest to deliver technical education in their classes. This was so because, the mean of all the items were below the 2.50 cut-up point. The standard deviation also signified it by showing how closer their opinions are to each other and to the mean. Besides, the test of the hypothesis at 46 degree of freedom and 0.05 level of significant, indicated the respondents share similar opinion on all the items present. Hence, the mean of the groups was non-significant which lead to upholding the null hypothesis, all the p-values were greater than the probability value of 0.05. The major challenges are: lack of school technology integrated pedagogy infrastructure; incompetent lecturers’ ability to integrate technology integrated pedagogy for teaching and learning, and curriculum is not directed to technology integrated pedagogy.

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**Discussion of Findings**

The finding with regards to research question two and null hypothesis two indicated that, TIP infrastructure are not available for delivery of teaching and learning in technical education. Similarly, the groups mean proved non-significant at 0.05 probability value under 46 degree of freedom. This implies that the infrastructure needed to accommodate the use of TIP in FCE (Tech) are not on available. Accordingly, this finding agreed with findings of Nyenwe and Ishikaku (2012) who found that institutions of learning in Nigeria lack enough infrastructure to accommodate ICT integrated technology instruction.

The findings of the study with regard to research questionone and null hypothesis at 46 degree of freedom and 0.05 level of significanceindicated that the mean responses of the groups was thatTIP was not integrated in teaching and learning in FCE (Tech) of Potiskum and Gomberespectively.This finding goes well with the findings made by Thomas and Oladejo (2017) who attributes that most tertiary institutions in Nigeria hold unto the traditional method of instruction which is less effective as against the TIP that is more effective in teaching and learning practices.Despite the potentials TIP offers in enhancing teaching and learning, many lecturers could not take this advantage of technology trend rather, hold on the traditional method of teaching and learning that was proved to be less effective particularly in this 21st century where knowledge and information sharing has been globalised.

Also, the finding with regard to research question three, shows that there are many challenges faced by lecturers of FCE (Tech) in integrating TIP in teaching and learning. The mean of the respondents shown that all items were responded with mean score above cut-up point of 2.50. Also, the test of the null hypothesis proved non-significant, meaning the groups means on each item are does not differs significantly. Hence, the challenges faced by lecturers in FCE (Tech)inGombe and Potiskum include: lack of school technology integrated pedagogy infrastructure; incompetent lecturers’ ability to integrate technology integrated pedagogy for teaching and learning, and curriculum is not directed to technology integrated pedagogy. This finding was in concord with the findings of Thomas and Oladejo (2017) andÖzdemir (2017) andwho pointed out that teachers faced so many challenges to integrate TIP in teaching and learning. In particular, the current curriculum provided by National Commission for Colleges of Education (NCCE) are not directed to be used with TIP, and if one wants to integrate TIP there are problems associated with infrastructure and TIP facilities.

**Conclusion**

The integration of technology integrated pedagogy is not gaining much ground in FCE(Tech) Potiskum and Gombe. This situation is connected to the fact that there are no infrastructural facilities to accommodate TIP learning environment, lecturerincompetence’sto use TIP in teaching and learningas well as the curriculum not directed for TIP for delivery of teaching and learning.

**Recommendation**

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The following recommendations were made based on the findings:

1. Lecturers of FCE (Tech) should strive more for the integrate of TIP teaching and learning practices.
2. Administrators should provide infrastructural facilities and enabling environment for TIP instructions
3. Human capacity building in the area of TIP to update lecturers with 21stcentury teaching and learning delivery
4. Curriculum planners should incorporate TIP in the curriculum.

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