INSTRUCTIONAL ACTIVITIES AND RESOURCES FOR QUALITY MANAGEMENT SKILLS IN BUILDING CONSTRUCTION TRADE IN TECHNICAL COLLEGES IN NIGERIA.

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Abstract

The purpose of the study was to determine the instructional activities and resources for effective inculcation of quality management skills in building construction students of technical colleges in Nigeria. The study was guided by two research questions and two hypotheses tested at .05 level of significance. The study adopted a survey research design and was carried out in the South East geo-political zone of Nigeria. The population for the study comprised 43 technical college building technology teachers, 20 building construction graduates and 23 industrial technical education lecturers with bias in building technology. This gave a total of 86 respondents. There was no sampling. A structured questionnaire which was validated by two building technology teachers and three industrial technical education lecturers was used for data collection. The internal consistency of the instrument was determined using crounbach Alpha coefficient and was found to be .85 and .78 for instructional activities and instructional resources respectively. The research questions were analyzed using frequency, mean and standard deviation while the hypotheses were analyzed using ANOVA. The findings were made up of 9 instructional activities and 12 instructional resources which include: exhibition of building materials and components of acceptable quality standards; fieldtrips to the best performing building construction firms and materials production yards; copies of construction designs; and resource persons such as registered builders, manufacturers of quality building materials/tools/equipment, and managers of top-ranking building construction firms. Based on the findings, it was recommended, among other things, that the relevant regulatory bodies should embark on the review of the present technical college building construction curriculum with a view to integrating the identified instructional activities and resources into it.

Introduction

The technical college is the foundation for the cultivation of worthwhile vocational habits and skills. According to the Federal Republic of Nigeria (FRN, 2013), technical colleges are designed to prepare individuals to acquire practical skills, basic scientific knowledge and attitudes required as craftsmen at Sub-professional level. The National Board for Technical Education (NBTE) in Ike et al (2018), sees the technical college as the institution where students are trained to acquire relevant knowledge and skills in different occupations for employment in the world of work. In their own contribution, Nwachukwu, Bakare and Jika in Ike et al (2018), explained that relevant and adequate knowledge, skills and attitude for employment in related occupations are provided for students in technical colleges. Therefore the technical college is the basic level institution for the

stimulation of technological and industrial development through the impartation of relevant skills into the citizenry. However, to adequately fulfill its mandate, the technical college offers a number of trades one of which is building construction.

Building construction is one of the trades in which people acquire skills in the technical college. According to the FRN (2006), building construction is the erection, alteration, extension, and repair of a building. The Council of Registered Builders of Nigeria (CORBON) and the Nigerian Institute of Building (NIOB) (2010), define building construction as all the activities associated with the erection and repair of immobile facilities. Further, Vanegas in Windapo and Omeife (2012), sees it simply as the bridge between concept and reality. Therefore building construction can be defined as the systematic process through which buildings are produced and maintained. In Nigeria however, this process is being confronted with so many challenges.

The challenges facing the Nigerian building industry include: defective structures (Bamisile, 2004; Udeagwu, 2006), use of quacks and untested materials/products (FRN, 2006), building collapse (FRN, 2006; Anuforo, Oretade, Okoronkwo & Daka, 2008; Jambol, 2012; and Onuoha & Olunkwa, 2012), time and cost overrun (Bamisile, 2004 & Udeagwu, 2006), and project failure or abandonment (Bamisile, 2004; Udeagwu, 2006; Sanni & Windapo, 2008; and Jimoh, 2012). These challenges cannot be allowed to continue for as Akindoyemi (2012) opined, any decline in the growth of the building industry will definitely induce a snowball effect on the other sectors and, consequently, a decline in the national economic growth. So, because of the pivotal role buildings play in the economy of any nation, the challenges listed above must be tackled head-on in order to avert total collapse of the industry and hence deeper decline in economic growth. According to Atkinson (1995), one sure way of achieving this is to give first place to quality in the building production process.

Therefore, quality is a necessary condition in building construction. For Denby (2003), a quality product is one that is perfectly fitted to its purpose-the purpose for which the customer has bought it. Bamisile (2004) defines quality as the totality of features and characteristics of a product or service that bear on its ability to satisfy stated needs. Weihrich and Koontz (2006), opine that before managers can revolutionize the production process, they must first revolutionize the way they think about quality. However, quality does not come about on its own. It is achieved through a systematic process called quality management. Therefore quality management in building construction consists of the application of knowledge and skills in the successful quality control and execution of building construction activities (Ezeji and Onoh, 2008). Management functions, according to Nwachukwu (2009), Alugbuo, (2000), and Weihrich & Koohtz, (2006), include: planning, organizing, directing, controlling, co-ordinating, motivating and communicating. The benefits of quality management practices in building construction have been found to include: customer satisfaction, reduced rework, job satisfaction, and prevention of time and cost overrun (Hoonakka, Carayon and Loushine, 2010; Liu, 2003; and Bamisile, 2004). Therefore quality management is so critical an issue to be ignored in the building production process as it focuses directly on the overall satisfaction of all the stake holders; not just the client.

It was on the basis of the foregoing that Igboko (2016) conducted a study

which focused on the integration of quality management skills into the building construction curriculum of technical colleges in Nigeria. The spur for the study was the belief that since technical college building construction graduates serve as supervisors and foremen in the industry, that is according to the NBTE (2007) and CORBON (2011), integrating quality management skills into their curriculum will place them in a position to better contribute to ensuring a robust and efficient building production process, and hence quality buildings. The study came up with a number of findings, including 21 specific objectives and 65 content areas of quality management skills for integration into the curriculum. It was therefore recommended that appropriate instructional activities and resources should be determined for effective inculcation of the quality management skills into the student. If this is not done, the institutions will continue to produce graduates who are not quality conscious and hence have nothing significant to contribute towards sanitizing the building industry.

Instructional activities, sometimes called teaching methods, are the vehicles that facilitate the achievement of lesson objectives. According to Onwuka (1996), instructional activities are the systematic means of presenting subject matter to achieve set goals. Okoroafor (2009) sees instructional activities as the devices, procedures or techniques adopted in order to attain stated objectives.

Further, Onyemerekeya(2008), defines instructional activities as the ways and means of conveying, communicating and inculcating ideas, skills and values implied in the aims and objectives of teaching. Therefore instructional activities are those techniques adopted by the teacher, during the teaching-learning encounter, to make the students acquire skills and ideas that are expected of them. Such skills and ideas will enable them solve real-life problems outside the school. However, given the many challenges plaguing the building industry in Nigeria, it does not seem as if the instructional activities used in training building construction students in technical colleges, who happen to be among the key players in the building production process upon graduation, are effective. But Onwe (2004) had found that field trips, demonstrations and projects can serve as effective instructional activities for the impartation of practical skills in building construction students. Nwachukwu (2001) had added systematic reporting, exhibitions and discussions, to the list of instructional activities suitable for technical and vocational education subjects. Further, Audu (2007), found that scaffolding, fading, cognitive apprenticeship and collaborative learning are instructional activities that can enhance students performance in building construction trades in technical colleges. However, similar to instructional activities are instructional resources which give life to the activities.

Instructional resources are needed to drive instructional activities. Offorma (1994) sees instructional resources as all forms of information carriers that can be used to promote and encourage effective teaching and learning activities. Ughamadu (2006) also defines instructional resources as the different kinds of materials used by the teacher and the entire class during the teaching-learning process to make it more effective and productive. According to Nwachukwu (2001), the acquisition of practical and applied skills as well as the basic scientific knowledge that would facilitate occupational efficiency requires performance and a skill –oriented instructional situation". Such an

instructional situation, according to the author, can be created through the utilization of instructional resources. He sees instructional resources in technical and vocational education as "all the practical and skill development resources that would facilitate the processes of teaching, learning and evaluation of vocational and technical skills". According to the author since technical subjects are vocational in nature, they must be taught with tools and equipment to make them meaningful and interesting to students. He categorized these facilities, which he insists must be adequate in order to meet the needs of students, as: tools, equipment and consumables.

Onwuka, cited in Nwachukwu (2001), lists out the advantages of instructional resources to include: the supply of a concrete basis for conceptual thinking and reduction of meaningless word responses of students; making learning more permanent; helping students develop an interest in the subject; offering a reality of experience, which stimulates self-activity on the part of the students; and providing experiences not easily obtained through other materials thereby contributing to the efficiency, depth and variety of learning.

Unfortunately, it can be seen that the current resources used in teaching building construction at the technical college level are not effective enough given the challenges plaguing the building construction process in Nigeria. More effective and productive instructional resources are needed to help in producing graduates who will contribute meaningfully towards solving current societal problems such as building collapse, prevalence of defective structures, project failure or abandonment and time/cost overrun. Onwe (2004) recommends constant use of quality materials such as quality sand, blocks, and cement as well as construction drawings; and tools such as Concrete mixers, concrete vibrators and many more. Also, Offorma (1994) recommends that, in addition to materials, instructional resources should include resource persons to whom the teacher turns in a bid to achieve stated goals. Onwuka (1996) also opines that the best way to help students learn is to bring them face to face with the world which education intends to introduce to them. This is done by using real things in real-life situations.

Purpose of the Study

The purpose of the study was to determine the instructional activities and resources for quality management skills in building construction trade in technical colleges.

Specifically, the study was designed to determine:

1. The instructional activities that could be employed for effective inculcation of quality management skills in building construction students of technical colleges.
2. The instructional resources that could be utilized for effective inculcation of quality management skills in building construction students of technical colleges.

Research Questions

The following research questions guided the study:

1. What are the instructional activities that could be employed for effective inculcation of quality management skills in building construction students of technical colleges?
2. What are the instructional resources that could be utilized for effective inculcation of quality management skills in building

construction students of technical colleges?

Hypotheses

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

1. There is no significant difference in the mean responses of building technology teachers in technical colleges, building construction graduates of technical colleges, and building technology lecturers of industrial technical education background on the instructional activities suitable for effective inculcation of quality management skills in building construction students of technical colleges.
2. There is no significant difference in the mean responses of building technology teachers in technical colleges, building construction graduates of technical colleges and building technology lecturers of industrial technical education background on the instructional resources suitable for effective inculcation of quality management skills in building construction students of technical colleges.

Method

A survey research design was adopted for the study. According to Olaitan, Ali, Eyo and Sowande (2000), survey is a research design that employs the study of large and small populations by selecting and studying a sample chosen from the population to discover the relative incidence, distribution and interrelations of sociological and psychological variables. The survey design was considered appropriate in the present study as it sought to sample the opinion of experts on the effective instructional activities and resources for the inculcation of quality management skills in building construction students of technical colleges.

The study was conducted in the South East geo-political zone of Nigeria. The zone is made up of five states-Abia, Anambra, Ebonyi, Enugu and Imo and was considered suitable for the study because it has adequate numbers of technical colleges, and building technology teachers/lecturers essential for the study. The South East was also chosen for the study because it has had its own fair share of the challenges confronting the building industry, and so the reasoning was that residents of the area would readily identify with the study. The population for the study was made up of 43 building technology teachers, 20 building construction graduates and 23 industrial technical education lecturers, giving a total of 86 respondents. There was no sampling as the population was manageable enough. The instrument for data collection was a structured questionnaire with three sections seeking information on the personal data of the respondents as well as the instructional activities and resources suitable for inculcating quality management skills in building construction students of technical colleges. Response to the items was based on a 4-point scale of Very Appropriate (VA), Appropriate (A), Moderately Appropriate (MA) and Not Appropriate (NA). The following points were assigned to the response options: VA= 4 points, A= 3 points, MA =2 points and NA= 1 point. The decision rule was based on the real limit of numbers, that is, scores between 0.5 and 1.49 were considered not appropriate, those from 1.50 to 2.49, moderately appropriate, those from 2.50 to 3.49, appropriate, and those from 3.50 to 4.00 very appropriate. The validation of the instrument was done by two building technology teachers in technical colleges and three building technology lecturers of

industrial technical education background from the University of Nigeria, Nsukka. The internal consistency of the instrument was determined using Cronbach Alpha coefficient and was found to be .85 and .78 for instructional activities and instructional resources respectively. The researcher worked with four research assistants. Each of the five (that is, the researcher and the four assistants) distributed the questionnaire in a particular state in the South East. This was done through personal contact enabling the researcher and his assistants to clarify any issues with the respondents.

The collected data were analyzed using frequency, mean and standard deviation to answer the research questions while ANOVA was used to analyze the hypotheses at .05 level of significance.

Results

Research Question 1

What are the instructional activities that could be employed for effective inculcation of quality management skills in building construction students of technical colleges?

Data for this research question are analyzed and presented in Table 1.

Table 1

Mean Reponses of Respondents on the Instructional Activities for Effective inculcation of Quality Management Skills in Building Construction Students.

S/N	Instructional Activities for Effective Inculcation of Quality Management Skills in Building Construction Students	$N_1 = 43$ $\bar{X}_1$	$N_2 = 20$ $\bar{X}_2$	$N = 23$ $\bar{X}_3$	$\bar{X}$ G	SD	Remark
1.	Projects on the production,, storage, handling and installation of building materials and components	3.58	3.65	3.45	3.57	0.70	VA
2.	Demonstration of the standard of workmanship required for any item of work	3.53	3.39	3.35	3.45	0.70	A
3.	Fieldtrips to the best performing building construction firms and materials production yards	3.44	3.57	3.30	3.44	0.70	A
4.	Exhibition of building materials and components of acceptable quality standards	3.67	3.39	3.30	3.51	0.70	VA
5.	Systematic reporting of the proper techniques and procedures for the execution of work items	2.88	3.13	3.20	3.02	0.89	A
6.	Discussions on the benefits of quality management in building construction	3.09	3.09	3.30	3.14	0.81	A
7.	Collaborative work on problem-solving	3.44	3.30	3.40	3.40	0.72	A
8.	Lectures on the planning, controlling, communicating and motivating skills for quality management	3.30	3.17	3.50	3.31	0.79	A
9.	Scaffolding techniques on working within time and budget	3.09	3.35	3.40	3.23	0.73	A

Cluster Mean = 3.34

Key: N_1 = Building Technology Teachers, N_2 = Building Construction Graduates, N_3 = Industrial Technical Education Lecturers. $\bar{X}_1$ = mean response of Building Technology Teachers, $\bar{X}_2$ = mean response of Building construction Graduates, $\bar{X}_3$ = Mean response of Industrial Technical Education Lecturers. XG = grand mean, SD = Standard deviation.

The result in Table 1 shows the mean responses of building technology teachers, graduates of building construction and industrial technical education lecturers on the appropriate instructional activities for the inculcation of quality management skills in building construction student at the technical college level. The data reveal that two items were rated very appropriate while the rest were rated appropriate. Again, a cluster mean of 3.34 was obtained for the research question showing that together all the items were found appropriate instructional activities for the inculcation of quality management skills in building construction students. Further, the standard deviation of each of the items was less than 1.00 showing that the responses of each respondent were clustered around the mean, giving the mean values more validity.

Hypothesis 1 ($H0_1$)

There is no significant difference in the mean responses of building technology teachers in technical colleges, building construction graduates of technical colleges and building technology lecturers on the instructional activities for effective inculcation of quality management skills in building construction students of technical colleges.

Analysis of Variance (ANOVA) result on this hypothesis is presented in Table 2.

Table 2

Analysis of Variance of the Responses of Respondents on the Instructional Activities for Effective Inculcation of Quality Management Skills in Building construction students of Technical Colleges

S/N	Instructional Activities for Effective Inculcation of Quality Management Skills in Building Construction Students Include:	N_1 = 43 $\bar{X}_1$	N_2 = 20 $\bar{X}_2$	N_3= 23 $\bar{X}_3$	$\bar{X}$ G	SD	F-value	Sig. of F	RMK
1.	Projects on the production, storage, handling and installation of building materials and components	3.58	3.65	3.45	3.57	0.70	0.46	0.63	NS
2.	Demonstration of the standard of workmanship required for various items of work	3.53	3.39	3.35	3.45	0.70	0.60	0.55	NS
3.	Field trips to the best performing building construction firms and materials production yards	3.44	3.57	3.30	3.44	0.70	0.77	0.47	NS
4.	Exhibition of building materials and components of acceptable quality standards	3.67	3.39	3.30	3.51	0.70	2.35	0.10	NS
5.	Systematic reporting of the proper techniques and procedures for the execution of work items	2.88	3.13	3.20	3.02	0.89	1.08	0.34	NS
6	Discussions on the benefits of quality management in building construction	3.09	3.09	3.30	3.14	0.81	0.50	0.61	NS
7.	Collaborative work on problem-solving	3.44	3.30	3.40	3.40	0.72	0.27	0.77	NS
8.	Lectures on the planning, controlling, communicating and motivating skills for quality management	3.30	3.17	3.50	3.31	0.79	0.93	0.40	NS
9.	Scaffolding techniques on working within time and budget	3.09	3.35	3.40	3.23	0.73	1.62	0.20	NS

Key: N_1 = Building Technology Teachers, N_2 = Graduates of Building Construction, N_3 = Industrial Technical Education Lecturers. $\bar{X}_1$ = mean response of Building Technology Teachers, $\bar{X}_2$ = mean response of Building Construction graduates, $\bar{X}_3$ = mean response of Industrial Technical Education Lecturers. XG = grand mean, SD = standard deviation. F is significant at $p \leq 0.05$.

The analysis in Table 2 shows that there were no significant differences in the mean responses of the respondents on all the nine items that make up the instructional activities for quality management skills in building construction. This therefore means that the null hypothesis of no significant difference is upheld in all the instances in table 2.

Research Question 2

What instructional resources are necessary for effective inculcation of quality management skills in building construction students of technical colleges?

Data for research question 2 are analyzed and presented in Table 3.

Table 3

Mean Responses of the Respondents on the Instructional Resources Necessary for Effective Inculcation of Quality Management Skills in Building Construction Students of Technical Colleges.

S/N	Instructional Resources Necessary for Effective Inculcation of Quality Management Skills	$N_1 = 43$ $\bar{X}_1$	$N_2 = 20$ $\bar{X}_2$	$N_3 = 23$ $\bar{X}_3$	$\bar{\bar{X}}$ G	SD	RMK
1.	Quality fine and coarse aggregates	3.70	3.57	3.50	3.62	0.69	VA
2.	Quality reinforcement bars	3.63	3.52	3.60	3.59	0.69	VA
3.	Cement of different types	3.30	2.86	2.80	3.07	0.69	A
4.	Tools/facilities such as: wheel barrows, spades, gauge boxes, weighing machines, vibrators, rammers, block moulds, block moulding machines, concrete mixers and mixing platforms	3.74	3.17	3.45	3.52	0.70	VA
5.	Copies of construction programmes	3.35	3.35	3.35	3.35	0.73	A
6.	Copies of construction cost plans	3.23	3.17	3.50	3.28	0.75	A
7.	Architectural drawings, schedules and specifications	3.63	3.48	3.65	3.59	0.62	VA
8.	Structural designs, schedules and specifications	3.51	3.22	3.75	3.49	0.70	A
9.	Service engineering designs, schedules and specifications	3.12	3.09	3.65	3.23	0.89	A
10.	The National Building Code	3.49	3.43	3.50	3.48	0.70	A
11.	Other building regulations	3.35	3.26	3.45	3.35	0.70	A
12.	Resource persons, such as: registered builders; manufacturers of quality building materials, tools and equipment; managers of top-ranking building construction firms; and industrial technical education experts.	3.47	3.48	3.65	3.51	0.72	VA

Cluster Mean = 3.42

Key: N_1 = Building Technology Teachers, N_2 = Building Construction Graduates, N_3 = Industrial Technical Education Lecturers. $\bar{X}_1$ = mean response of Building Technology Teachers, $\bar{X}_2$ = mean response of Building Construction graduates, $\bar{X}_3$

= mean response of Industrial Technical Education Lecturers. XG = grand mean, SD = standard deviation.

In Table 3, the mean ratings of the respondents on what should be included as suitable instructional resources for the inculcation of quality management skills in building construction students are displayed. The data reveal that five of the items were rated very appropriate while the remaining seven were rated appropriate. A cluster mean of 3.42 further shows that all the items are appropriate instructional resources for the inculcation of quality management skills in building construction students. Further, the standard deviation of each of the responses to the items was less than 1.00, giving the mean values added validity.

Hypothesis 2 ($H0_2$)

There is no significant difference in the mean responses of building technology teachers in technical colleges, building construction graduates of technical colleges and building technology lecturers of industrial technical education background on the relevant instructional resources for the inculcation of quality management skills in the building construction students of technical colleges.

Analysis of variance (ANOVA) result for this hypothesis is presented in Table 4.

Table 4:
Analysis of Variance of Responses of the Respondents on the Instructional Resources necessary for effective inculcation of Quality Management Skills in Building Construction students of Technical Colleges.

S/N	Instructional Resources for the Inculcation of Quality Management Skills in building Construction Students	$N_1 = 43$ $\bar{X}_1$	$N_2 = 20$ $\bar{X}_2$	$N_3 =$ $\bar{X}_3$	$\bar{X}$ G 23	SD	F-Value	Sig. of F	RMK
1.	Quality fine and coarse aggregates	3.70	3.57	3.50	3.62	0.69	0.64	0.53	NS
2.	Quality reinforcement bars	3.63	3.52	3.60	3.59	0.69	0.17	0.84	NS
3.	Cement of different types	3.30	2.86	2.80	3.07	0.96	2.65	0.08	NS
4.	Tools/facilities such as: wheel barrows, spades, gauge boxes, weighing machines, vibrators, rammers, block moulds, block moulding machines, concrete mixers and mixing platforms.	3.74a	3.17b	3.45ab	3.52	0.70	5.71	0.01	Sig
5	Copies of construction programmes	3.35	3.35	3.35	3.35	0.73	0.00	1.00	NS
6	Copies of construction cost plans	3.23	3.17	3.50	3.28	0.75	1.20	0.31	NS
7	Architectural drawings, schedules and specifications	3.63	3.48	3.65	3.59	0.62	0.54	0.59	NS
8	Structural designs, schedules and specifications	3.51ab	3.22b	3.75a	3.49	0.70	3.33	0.04	Sig
9	Service engineering drawings, schedules and specifications	3.12	3.09	3.65	3.23	0.89	3.01	0.06	NS
10	The National Building Code	3.49	3.43	3.50	3.48	0.70	0.06	0.94	NS
11	Other building regulations	3.35	3.26	3.45	3.35	0.70	0.39	0.68	NS
12	Resource persons such as: registered builders,	3.47	3.48	3.65	3.51	0.72	0.48	0.62	NS

	manufacturers of quality building materials, tools and equipment; managers of top-ranking building construction firms: and industrial technical education experts.

Key: N_1 = Building Technology Teachers, N_2 = Building Construction Graduates, N3 = Industrial Technical Education Lecturers. $\bar{X}_1$ = mean response of Building Technology Teachers, $\bar{X}_2$ = mean response of Building Construction graduates, $\bar{X}_3$ = mean response of Industrial Technical Education Lecturers. XG = grand mean, SD = standard deviation. F is significant at $p \leq 0.05$.

Note: Letters of the alphabet (a, b and c) indicate mean difference as determined using the scheffe test. Means with the same letters of the alphabet are not significantly different while those with different letters are significantly different.

The analysis in Table 4 reveal that there were no significant differences in the mean responses of the respondents on ten of the items, while the means of their responses in the remaining two items differed significantly. Scheffe post HOC test was then carried out to determine the source of the difference. The results are presented in tables 5 and 6.

Table 5
Scheffe Post HOC Test: Means of Groups in Homogenous Subsets in item 4 of Table 4

Status	**N**	**Subsets for alpha = 0.05**	
		1	**2**
Building construction graduates	20	3.1739	
Industrial Technical Education Lecturers	23	3.4500	3.4500
Building Technology Teachers	43		3.7442
Sig		**.333**	**.287**

The scheffe Post HOC test in respect of item 4 of table 4 whose ANOVA result was found to be significant indicates that the mean of Industrial Technical Education lecturers ($\bar{x}$ = 3.4500) is not significantly different from either the mean of building construction graduates or the mean of building technology teachers. However, the mean of building technology teachers differs significantly from the mean of building construction graduates. The mean of the building construction graduates, which is the lowest, shows that the group is the major source of the difference.

Table 6
Scheffe Post HOC Test: Means for Groups in Homogenous Subsets in item 8 of Table 4

Status	N	Subsets for alpha = 0.05	
		1	2
Building construction graduates	23	3.2174	
Building Technology Teachers	43	3.5116	3.5116
Industrial Technical Education Lecturers	20		3.7500
Sig		**.306**	**.458**

The scheffe post HOC test in respect of item 8 of table 4 whose ANOVA result was significant indicates that the mean of building technology teachers does not differ significantly from both the mean of building construction graduates and that of industrial technical education lecturers. But the mean of industrial technical education lecturers, which is the highest, differs significantly from the mean of building construction graduates, which is the lowest. This shows that the mean of the building construction graduates indicates that the group is the major source of the difference.

Discussion of Findings

The findings of the study in Table 1 showed that the nine instructional activities identified for the study were all rated appropriate by the respondents. It therefore follows that all nine instructional activities are suitable for the inculcation of quality management skills in building construction students of technical colleges. This finding is in line with Nwachukwu (2001) who opined that among the suitable instructional activities in technical and vocational education are: the project, demonstration, field trips, exhibition, systematic reporting and lecture methods. It is also in agreement with Audu (2007) who found that the use of constructivist instructional techniques such as scaffolding, fading, and collaborative learning are very effective in teaching building construction trades in the technical college. Further, the finding is in line with Onwe (2004) who found that field trips, demonstrations and projects are effective in teaching practical skills in building construction. Again, there was no significant difference in the mean responses of the respondents on the instructional activities. This shows that all the respondents are in agreement on the effectiveness of the nine instructional activities in the inculcation of quality management skills in building construction students of technical colleges. This therefore means that the null hypothesis of no significant difference is upheld in all the instances.

The findings of the study in Table 3 showed that all the twelve instructional resources identified for the study were rated appropriate by the respondents. This indicates that the 12 instructional resources are considered effective for the inculcation of quality management skills in building construction students of technical colleges. This finding is in line with Onwe (2004) who found that the use of materials/facilities such as wheel barrow, concrete mixer, concrete vibrator, sand, blocks, cement, reinforcement bars and construction drawings are particularly very effective in teaching practical components in building technology. The findings are also in line with Nwachukwu

(2001) and Onwuka (1996) who opined that the materials/facilities for teaching technical and vocational subjects should include tools, equipment and consumables that offer a reality of experience and stimulate self-activity in students. The findings are equally supported by Offorma (1994) who sees instructional resources as anything or anybody, including resource persons, to whom the teacher turns for help in his goal-seeking activities.

However, significant differences were observed in the mean responses of the respondents on two of the twelve instructional resources. The result of the Scheffe Post hoc analysis however revealed that the differences in the opinions of the respondents could be attributed to differences in the levels of the respondents in the technical and vocational education profession. But no significant difference was found in the opinions of the respondents on the remaining 10 instructional resources. This implies that the seemingly different levels of the respondents in the technical and vocational education profession did not have significant effect on their mean responses. It can therefore be concluded that there is no significant difference in their mean responses as shown in the overall ANOVA result. This shows that the various instructional resources identified for the study are considered effective in the inculcation of quality management skills in building construction students of technical colleges.

Conclusion

The technical college is the institution where building supervisors and foremen are trained. These categories of construction workers are critical as they impact tremendously on the production process as well as the quality of output. Unfortunately, the instructional activities and resources used in training building construction students of technical colleges have been found to be ineffective as the graduates of the programme lack the necessary quality management skills needed for an effective and efficient building production process. This situation might be responsible for the many challenges facing the building industry.

Therefore, the objective of the study was to determine the instructional activities and resources that could be employed for effective inculcation of quality management skills in building construction students of technical colleges. Based on the findings of the study, it becomes very necessary to integrate the determined instructional activities and resources into the building construction programme to ensure the production of graduates who possess the skills needed to bring about a robust and efficient building production process and hence, quality buildings.

Recommendations

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

1. Research should be conducted to determine effective evaluation strategies that will facilitate the acquisition of quality management skills by building construction students of technical colleges in Nigeria.
2. Experts in building production management and industrial technical education should be encouraged to produce textual materials on the instructional activities and resources necessary for effective inculcation of quality management skills in building construction students.
3. The National Board for Technical Education (NBTE) should begin

the process of reviewing the present building construction programme of technical colleges with a view to integrating the determined instructional activities and resources into it.

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