MECHANICAL EDUCATION TECHNOLOGY (MET) FOR POLITICAL STABILITY AND SECURITY IN NIGERIA.

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Abstract

In recent years, the integration of technology in education has gained significant momentum worldwide. Nigeria, as a developing nation, recognizes the importance of harnessing the potential of technology to improve educational outcomes. Specifically, the implementation of Mechanical Education Technology (MET) in teacher training programs has the potential to positively impact political stability and security in the country. Technical and Vocational Education and Training (TVET) programs, particularly in the field of Mechanical Education Technology, have witnessed significant advancements through the incorporation of digital technology. The objective of this paper is to explore the implications of mechanical education technology for political stability and security in Nigeria, highlighting its potential benefits and challenges. Also the focus is on understanding how the integration of technology in mechanical education can contribute to societal stability and enhance security measures. This in turn, enhances their instructional effectiveness, enabling them to nurture critical thinking, problem-solving, and digital literacy skills in students. Competent teachers lay the foundation for a well-rounded education system that fosters political stability and security.

Keywords: Mechanical Education Technology, Political Stability, Security, TVET, Technology

Introduction

In recent years, the integration of technology in education has become increasingly important. Teacher Mechanical Education Technology (TMET) refers to the utilization of technological tools and resources to enhance teaching and learning processes in mechanical education (Hamdan, *etal*; 2019). In the Nigerian context, TMET holds significant implications for various aspects, including security in critical infrastructures, promoting technological innovations, closing the skill gap, enhancing skill development and employability, enhancing teacher competency, fostering critical thinking and problem-solving skills, addressing educational disparity, and addressing various challenges and considerations (Osinem, 2021). This article explores the implications of TMET on political stability and security in Nigeria based on these subtopics. Also, the integration of technology in education has revolutionized the way we teach and learn. Technical and Vocational Education and Training (TVET) programs, particularly in the field of mechanical education, have witnessed significant advancements through the incorporation of educational technology (Balasooriya & Kulathunga 2020).

This opinion paper aims to discuss the implications of mechanical education technology for political stability and security. TMET not only benefits students but also enhances the competency of teachers (Hamdan, *etal*; 2019). Continuous professional development programs focusing on technological integration in mechanical education enable teachers to stay updated with the latest teaching methodologies and technological advancements. This, in turn, enhances their instructional effectiveness, enabling them to nurture critical thinking, problem-solving, and digital literacy skills in students. Competent teachers lay the foundation for a well-rounded education system that fosters political stability and security.

Concept of Mechanical Education Technology (MTE):

Mechanical Education Technology refers to the use of technological tools and resources to enhance teaching and learning in the field of mechanical engineering. This approach integrates various technologies to create interactive and engaging learning experiences for students studying mechanical engineering concepts and principles. By incorporating these technologies into mechanical education, educators can create dynamic and interactive learning experiences that cater to different learning styles and preferences (Rajput 2013). This approach not only enhances student engagement and motivation but also prepares them for the demands of the modern engineering industry, where technology plays a crucial role in design, analysis, and problem-solving for political stability (Rajab & *etal;* 2020). Some key aspects of Mechanical Education Technology include:

1. Simulation software: Simulation software allows students to visualize and experiment with mechanical systems in a virtual environment. This helps them understand complex concepts and principles by providing hands-on experience without the need for physical equipment.
2. 3D modeling and design software: Tools such as CAD (Computer-Aided Design) software enable students to create and analyze mechanical designs in a digital space. This enhances their understanding of engineering principles and helps them develop practical skills in designing mechanical components and systems.
3. Online learning platforms: Online platforms offer a convenient way for students to access course materials, lectures, and assignments. These platforms often include interactive modules, videos, and quizzes to engage students and reinforce their understanding of mechanical engineering concepts.
4. Virtual labs: Virtual labs allow students to conduct experiments and simulations remotely, providing practical experience in a controlled and safe environment. This technology enables students to apply theoretical knowledge to real-world scenarios and develop problem-solving skills.
5. Augmented reality (AR) and virtual reality (VR): AR and VR technologies can be used to create immersive learning experiences in mechanical engineering. Students can explore complex machinery and systems in a simulated environment, enhancing their spatial understanding and visualization skills.

Connect of Mechanical Education Technology (MTE) for political stability:

The concept of using MTE to promote political stability in Nigeria involves leveraging technological tools and resources in the field of mechanical engineering education to address societal challenges and contribute to the overall stability and development of the country. By integrating technology into education, particularly in the field of mechanical engineering, Nigeria can enhance its workforce's skills, drive innovation, and improve infrastructure, ultimately fostering political stability. Here are some ways in which mechanical education technology can contribute to political stability in Nigeria:

1. Skill development: By incorporating simulation software, 3D modeling tools, and virtual labs into mechanical engineering education, Nigerian students can acquire practical skills that are in demand in the job market. This can lead to higher employment rates and economic empowerment, reducing social unrest and promoting political stability.
2. Infrastructure development: Mechanical education technology can help train engineers who are equipped to design and develop infrastructure projects essential for the country's

growth. By utilizing CAD software and other design tools, students can contribute to the construction of roads, bridges, and other critical infrastructure, improving the quality of life for Nigerians and enhancing political stability.

3. Innovation and entrepreneurship: Technology-driven education in mechanical engineering can foster a culture of innovation and entrepreneurship among Nigerian students. By encouraging creativity and problem-solving skills through hands-on projects and design challenges, students can develop solutions to local challenges, create job opportunities, and drive economic growth, all of which are essential for political stability.
4. Access to education: Online learning platforms and digital resources can help expand access to quality education in mechanical engineering across Nigeria, reaching students in remote areas and underserved communities. By democratizing education and providing opportunities for skill development, technology can empower individuals, reduce inequality, and promote social cohesion, ultimately contributing to political stability.
5. Industry partnerships: Collaboration between educational institutions and industry stakeholders can ensure that mechanical engineering education aligns with the needs of the job market. By integrating industry-relevant skills and knowledge into the curriculum, students can be better prepared for employment, fostering economic stability and reducing social tensions.

Overall, leveraging mechanical education technology to promote political stability in Nigeria involves investing in human capital, fostering innovation, and improving infrastructure through technology-driven education initiatives. By equipping the workforce with relevant skills and empowering individuals to contribute meaningfully to society, Nigeria can build a more stable, prosperous future and secure environment for its citizens.

Concept of Mechanical Education Technology (MTE) for security in Nigeria

The concept of using MTE to enhance security in Nigeria involves leveraging technological tools and resources in the field of mechanical engineering education to address security challenges and contribute to the overall safety and stability of the country. By integrating technology into education, particularly in the field of mechanical engineering, Nigeria can improve its security infrastructure, develop innovative solutions for security threats, and build a skilled workforce capable of addressing security challenges effectively (Otero & *etal;* 2020). Here are some ways in which mechanical education technology can contribute to security in Nigeria:

1. Development of security equipment: By incorporating advanced design and simulation software into mechanical engineering education, students can learn to design and develop security equipment such as surveillance systems, drones, sensors, and access control mechanisms. These technologies can enhance security measures in public spaces, critical infrastructure, and border areas, helping to prevent and respond to security threats.
2. Infrastructure security: Mechanical education technology can help train engineers who specialize in securing critical infrastructure such as power plants, transportation networks, and communication systems. By equipping students with skills in structural design, risk assessment, and security protocols, Nigeria can strengthen the resilience of its infrastructure against security threats like terrorism, sabotage, and cyber attacks.

3. Disaster response and management: Through virtual labs and simulation tools, mechanical engineering students can learn to model and analyze disaster scenarios, develop emergency response plans, and design resilient structures to mitigate the impact of natural disasters and other emergencies. This preparedness can improve the country's ability to respond to crises and ensure the safety of its citizens.
4. Cybersecurity solutions: Mechanical education technology can also include training in cybersecurity principles and practices, preparing students to address digital threats to national security. By integrating cybersecurity concepts into the curriculum, Nigeria can build a workforce capable of safeguarding critical information systems, preventing cyber attacks, and protecting sensitive data from unauthorized access.
5. Innovation in security technology: Technology-driven education in mechanical engineering can foster innovation in security technology, leading to the development of cutting-edge solutions for emerging security challenges. By encouraging research and development in areas such as biometrics, artificial intelligence, and robotics, Nigeria can stay ahead of evolving security threats and enhance its overall security posture.

In summary by embracing mechanical education technology to enhance security, Nigeria can build a more secure and resilient society, better equipped to address a wide range of security challenges. By investing in education, research, and innovation in mechanical engineering, the country can strengthen its security infrastructure, develop skilled professionals, and promote a culture of safety and security for all its citizens especially the teacher skill and competence..

Enhancing Teacher Competence, Skill Development and Employability

Teacher competence is a crucial factor in shaping the quality of education, which in turn has a direct impact on political stability and security (Balasooriya & Kulathunga 2020). By integrating MET into teacher training programs, educators can acquire advanced technical skills, digital literacy, and pedagogical knowledge necessary to effectively teach and prepare students for the future workforce. When teachers are equipped with the necessary skills, they can raise the overall quality of education, ensuring that students receive a well-rounded education that includes science, technology, engineering, and mathematics (STEM) subjects (Hamdan, *etal;* 2019). This, in turn, can contribute to a more skilled and innovative workforce, reducing unemployment rates, and promoting socio-economic development. Mechanical Education Technology, including virtual simulations, computer-aided design (CAD) software, and interactive learning platforms, has the potential to enhance skill development among students. By providing hands-on training in a virtual environment, students can develop practical skills and gain a deeper understanding of mechanical concepts (Oxfam India 2018). This, in turn, improves their employability prospects, leading to stable and productive careers.

A well-trained and skilled workforce contributes to political stability by reducing unemployment rates and social unrest, as individuals have access to better economic opportunities. TMET facilitates the development of practical and industry-relevant skills among students (European Commission 2020). By integrating virtual simulations, computer modeling, and hands-on projects, students gain valuable experience in applying theoretical knowledge to real-world scenarios. This practical exposure enhances their employability prospects, as they possess the necessary skills and competencies desired by employers. By producing a highly skilled workforce, TMET contributes to reducing unemployment rates and promoting political stability through increased economic productivity.

Fostering Critical Thinking and Problem-Solving Skills

Mechanical Technology Education (MET) is the application of engineering principles and technological developments for the creation of useful products and production machinery. Mechanical Education Technology (MET) encourages active learning, critical thinking, and problem-solving skills among students. When teachers incorporate hands-on learning experiences using technologies such as robotics, 3D printing, and automation, students are exposed to real-world challenges and learn to think critically and find innovative solutions. This type of education can nurture an entrepreneurial mindset, empowering students to become agents of change. By equipping students with these skills, Nigeria can foster a generation of forward-thinking individuals who have the ability to address socio-political issues, contribute to political stability, and promote security in the country (Osinem, 2021). The integration of Teacher Mechanical Education Technology (TMET) encourages critical thinking and problem-solving skills among students. By engaging in project-based learning, students are motivated to learn hand on skills from the teachers.

Addressing Educational Disparities

Nigeria faces significant educational disparities between urban and rural areas, as well as gender-based inequalities. The integration of Mechanical Education Technology (MET) can help bridge these gaps by providing equal access to quality education. Online platforms, mobile learning applications, and virtual reality simulations can reach remote areas and underserved populations, providing educational opportunities that were previously limited. By ensuring access to quality education for all, MET contributes to reducing inequalities, fostering social cohesion, and promoting political stability (Balasooriya & Kulathunga 2020). TVET institutions with the flexibility to develop curricula often work closely with industry and other partners to do so. Curriculum design can be consultative even in more centralized models. Industry plays a direct role in both institutional governance and in the development of curricula and associated standards. In Italy at the Cometa Formazione Oliver Twist School, hospitality industry partners set the competency requirements for a hospitality certificate for migrants that addresses the needs of the industry, the migrants and the community (Kamarudin & Teh 2017). Shenzhen Polytechnic in China works closely with a specific industry partner, Huawei, to develop programmes and courses that deliver both an academic credential and an industry certificate for ICT programmes (Yongxue, 2021). Following a series of general education courses at Shenzhen Polytechnic, students specialize in areas such as data communication, cloud computing and artificial intelligence as they pursue one of three levels of industry certification. Shenzhen Polytechnic works closely with its industry partner to regularly review and redesign the courses to fit both the needs of the local ICT industry and broader society

Challenges and Considerations

While Mechanical Education Technology (MET) offers immense potential, its implementation in Nigeria faces several challenges. These include inadequate infrastructure, limited internet connectivity, lack of training opportunities for teachers, and socio-cultural factors (Batholmeus & Pop 2019). To overcome these challenges, the government and educational institutions should prioritize investments in infrastructure, provide access to reliable internet connectivity, and establish comprehensive training programs for teachers. Additionally, collaboration between policymakers, educators, and technology experts is necessary to create a conducive environment for the successful integration of MET into the education system (Paterson, Keevy & Boka 2017).

Closing the Skills Gap

According to Osinem, (2021) Nigeria faces a significant skill gap in the mechanical engineering sector. Teacher Mechanical Education Technology (TMET) provides an

opportunity to bridge this gap by equipping teachers with the necessary knowledge and skills to train students effectively. Through professional development programs, teachers can enhance their proficiency in utilizing technological tools and resources. This, in turn, enables them to deliver high-quality instruction that aligns with industry demands, ensuring that students graduate with the relevant skills required for the workforce. Closing the skill gap enhances employment opportunities, reduces social unrest, and contributes to political stability. One of the significant challenges faced by many countries is the skills gap in the mechanical industry. The integration of technology in mechanical education can help bridge this gap by equipping students with up-to-date knowledge and skills (Otero, Cole & Lima 2020). By incorporating cutting-edge tools and technologies, such as robotics and automation, students are prepared to meet the demands of the modern job market. By reducing the skills gap, mechanical education technology promotes stability in the industrial sector and strengthens the overall economy, which has positive implications for political stability. TVET institutions can leverage closer collaboration with higher education to create strong pathways for students with multiple exit points (Peterson, Keevy & Boka 2017). For example, a collaboration between Siemens Ltd and the Swineburne University of Technology in Australia has created a two-step learning pathway in Applied Technologies (UNESCO-UNEVOC 2020). Students first receive a Diploma of Applied Technologies, linked to the VET system. At this point they can enter the workforce as an Engineering Technician, or they can continue their learning journey to receive an Associate Degree of Applied Technologies, qualifying them for work as an Associate Engineer (Shiohira, 2021).

Promoting Technological Innovation

Teacher Mechanical Education Technology (TMET) empowers teachers to instill a culture of technological innovation among students (Olanrewaju, *etal;* 2020). By incorporating emerging technologies into the curriculum, such as 3D printing, Internet of Things (IoT), and robotics, students are exposed to cutting-edge concepts and tools. This exposure enhances their creativity, problem-solving abilities, and adaptability to technological advancements. Consequently, students become more capable of contributing to technological innovations in various sectors, positively impacting political stability and security by fostering economic growth and reducing dependence on outdated technologies. Mechanical education technology encourages students to think creatively, problem-solve, and innovate (Husain, *etal;* 2020). By utilizing modern tools and software, students can explore new design concepts, test prototypes, and develop efficient solutions. This emphasis on innovation fosters a culture of technological advancement within the mechanical industry. When a society encourages and supports innovation, it leads to economic growth, job creation, and improved living standards. A technologically advanced society is more likely to enjoy political stability as it demonstrates resilience and adaptability to global changes.

Security in Critical Infrastructures

Teacher Mechanical Education Technology (TMET) plays a crucial role in strengthening security in critical infrastructures. By incorporating technology into mechanical education, teachers can educate students on the importance of secure and sustainable infrastructure systems. Through hands-on experiences with Computer-Aided Design (CAD) software, simulations, and virtual reality, students can develop a deeper understanding of infrastructure vulnerabilities and learn how to design systems with robust security measures (Maurer & Gonon 2014). This knowledge equips future engineers and technicians to contribute to the development of secure infrastructure systems, enhancing political stability and security in Nigeria. Mechanical systems are integral to critical infrastructures such as transportation, energy, and manufacturing (Maurer & Gonon 2014). The proper functioning and security of these

systems are vital for a stable society. The integration of mechanical education technology allows students to understand the complexities of these systems and develop the skills needed to maintain and secure them (Cedefop. 2020). By training a competent workforce, the risk of mechanical failures, accidents, and security breaches can be minimized. Ensuring the security of critical infrastructures promotes political stability by safeguarding public safety and maintaining the continuity of essential services.

The significance of mechanical education technology for political stability and security are significant. By enhancing skill development, closing the skills gap, promoting innovation, and securing critical infrastructures, technology integration in mechanical education plays a crucial role in building a stable and secure society. Governments, educational institutions, and industry stakeholders must collaborate to invest in and implement these technologies to reap their full benefits. By doing so, we can create a future where technological advancements contribute to political stability, economic growth, and societal well-being.

Recommendations

Recommendations for leveraging Mechanical Education Technology (MET) to promote political stability and security in Nigeria:

1. **Curriculum Enhancement**: Update the mechanical engineering curriculum in Nigerian educational institutions to include courses on security engineering, infrastructure protection, and disaster management. Integrate hands-on projects and simulations using MET tools to provide practical skills relevant to security challenges.
2. **Partnerships with Security Agencies**: Collaborate with security agencies in Nigeria to identify specific skill sets and technologies needed for enhancing security measures. Establish partnerships to provide students with real-world projects, internships, and research opportunities in the security sector.
3. **Investment in Research and Development**: Allocate resources for research and development in MET focusing on security innovations such as surveillance systems, drone technology, cybersecurity solutions, and disaster response mechanisms. Encourage students and faculty to engage in research that addresses security issues in Nigeria.
4. **Professional Development Programs**: Offer training programs and workshops for professionals in the security sector to enhance their knowledge of MET tools and technologies. Provide opportunities for continuous learning and skill development to ensure that security personnel are equipped with the latest advancements in mechanical education technology.
5. **Public-Private Partnerships**: Foster collaborations between educational institutions, government agencies, and private sector companies to drive innovation in security technology. Create opportunities for industry experts to mentor students, fund research projects, and support the implementation of MET solutions for political stability and security.
6. **Community Engagement**: Engage local communities in security awareness programs that highlight the role of MET in enhancing security measures. Empower communities to participate in security initiatives and utilize technology-driven solutions to address safety concerns at the grassroots level.
7. **Policy Support**: Advocate for policies that promote the integration of MET in security planning and infrastructure development at the national level. Encourage policymakers to prioritize investments in education technology that contribute to political stability and security in Nigeria.

By implementing these recommendations, Nigeria can harness the power of Mechanical Education Technology to strengthen political

stability, enhance security measures, and build a skilled workforce capable of addressing complex security challenges. Through collaboration, innovation, and continuous learning, Nigeria can create a safer and more stable environment for its citizens

Conclusion

The implications of teacher mechanical education technology for political stability and security in Nigeria are significant. By leveraging the potential of MET, Nigeria can enhance teacher competence, foster critical thinking skills, address educational disparities, and empower students to become active contributors to socio-political stability (Olanrewaju, etal 2020). However, to realize these benefits, the government, educational institutions, and stakeholders must work collaboratively to overcome existing challenges and ensure the effective integration of MET into teacher training programs. By doing so, Nigeria can pave the way for a brighter future, where education serves as a catalyst for political stability, security, and sustainable development.

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