Emerging Technologies in Youth Education "Threshold to Society 5.0"

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ABSTRACT
Background: Emerging technologies are revolutionizing youth education by introducing novel tools and methods that significantly enhance learning experiences. This transformation is crucial as it paves the way to Society 5.0, a future where digital advancements seamlessly integrate with everyday life to address complex societal challenges and foster human-centric innovation. Such progress promises to redefine educational paradigms and societal interactions. **Methods:** The study adopted a descriptive survey design, involving a sample of 350 teachers from 25 secondary schools and 10 universities across the West African region. Data were gathered using the "Emerging Technologies in Youth Education and Development Questionnaire (ETYEDQ)," which had a reliability coefficient of 0.85. Questionnaires were distributed to teachers through Google Forms. Data collected were analyzed descriptively and hypotheses were tested using t-test, and ANOVA at significance level of 0.05. **Results:** The study found that teachers viewed emerging technologies as crucial for enhancing educational outcomes and fostering youth innovation. Secondary school teachers appreciated digital classrooms and educational apps, while university lecturers valued online courses and virtual labs. However, barriers such as inadequate infrastructure, lack of teacher training, and unequal access to technology, especially in rural areas, were identified. **Conclusion:** Emerging technologies are essential for youth empowerment and societal innovation in West Africa. To overcome the challenges, it is recommended that stakeholders invest in technological infrastructure, provide professional development for educators, and implement policies for equitable technology access. These steps could significantly improve education and empower youth in alignment with Society 5.0 goals.

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INTRODUCTION

Educators in Nigeria increasingly view the integration of new technologies into youth education not just as an option, but as a fundamental requirement. This perspective stems from the profound influence of technology on education, particularly in light of evolving learning environments, the necessity for adaptable teaching methods, and the imperative to cultivate creativity and innovation within the youth education. The use of new technologies in Nigerian youth education has become so pervasive in Nigerian and secondary schools and universities that it is altering both the organization and structure of education as well as the performance of Nigerian educators. Adoption and use of emerging technologies facilitates increased interaction between instructors and students outside of the lecture hall and allows for flexible scheduling of lectures (Oliveira et al., 2019).

In addition to streamlining the process of teaching and learning in education, emerging technologies enhance the caliber of materials, interactions, and instructional strategies (Onyema, 2020). Since its absence can lead to ignorance, bad choices, and eventually corporate failure, information technology has emerged as a vital resource (Onyema, 2020). According to Jawad et al. (2014), technology is essential to every business, including banking, aviation, education, health care, legal, and security, to name a few. According to De Alwis et al. (2021), emerging technology is defined as technological innovations, applications, and breakthroughs that are still in the early phases of development, have the potential to have a major impact on society, and are anticipated to be widely adopted in the near to medium term. Kroon, do Céu Alves, and Martins (2021) define emerging technologies as those that are new and whose use is increasing, including creative new uses for already-existing technology.

These technologies need to be continuously monitored and assessed since they bring both opportunities and hazards to enterprises. Emerging technologies, like wearable gadgets such as head-mounted displays and sensors, as well as virtual and augmented reality (VR/AR), artificial intelligence (AI), and the Internet of Things (IoT) enabled by the rapid 5G mobile standard, are continually evolving. These innovations are fostering the development of new digital ecosystems driven by the data generated from the extensive online interactions between

individuals and their devices, alongside other emerging technologies yet to be fully discovered (Riina, Yves & Cabrera, 2020). The integration and utilization of established technologies such as Virtual Reality, Augmented Reality, Artificial Intelligence, the Internet of Things, and Cloud Computing in educational systems have led to the creation of more reliable and effective learning environments.

Globally, universities are increasingly incorporating these emerging technologies into both formal and informal teaching and learning practices, often with the assistance and encouragement of students who are already familiar with these technologies in their daily lives. Unlike conventional teaching methods that are teacher-centric and uniform, emerging technologies offer a more personalized, adaptable, and diverse approach to addressing individual learning needs and pedagogical strategies, providing students with greater flexibility and choice (Hawthorn, 2018). Emerging technologies are inventions, techniques, and discoveries that are applied to a range of educational settings and goals. Therefore, employing emerging technologies to enhance teaching and learning requires institutional resources for financing, assessing, and rewarding creative educational approaches.

The development of educational technologies has been accelerating for over ten years, however many universities and secondary schools in Nigeria find it difficult to understand and implement new developments. In order to guarantee that secondary school and university students obtain a top-notch education, Almufarreh and Arshad (2023) present important new educational technology that administrators and lecturers need to know about and understand. Virtual Reality is the first emerging technology. Virtual Reality (VR) is a technology that generates a simulated environment through an artificial digital space and interactive computer-generated experiences. It has the capability to produce either a fantasy realm, enabling experiences beyond the constraints of ordinary physical reality, or a lifelike setting mirroring the real world. The origins of VR, as we recognize it today, trace back to developments in the 1960s (Sun, Wu & Cai, 2019).

Virtual reality (VR) technology in education offers a fresh way to learn that usually improves the traditional method. Students' enthusiasm in learning in novel methods that incorporate sensory information is heightened by this creative approach. Virtual reality can be used to display functioning or activities more accurately (Smutny, 2022). A key advantage of utilizing Virtual Reality (VR) in education lies in its capacity to aid students in grasping and exploring abstract or intricate concepts within a safe and controlled environment (Bourhim & Cherkaoui, 2020; Morélot et al., 2021). By means of computer-generated simulations, students can delve into environments that might otherwise be inaccessible to them. VR immerses users in computer-generated surroundings, aiming to heighten the realism of simulations through interactive engagement, thereby enhancing the overall efficacy and impact of educational experiences.

Another significant technological advancement is Augmented Reality (AR). AR overlays digital images onto real-world environments, creating an amalgamated perspective. Its importance is expected to grow as more smartphones and other AR-compatible devices become widespread. According to Charles McLellan, there are several notable distinctions between Virtual Reality (VR) and Augmented Reality (AR). VR provides users with spatially constrained experiences, despite its potential for creating countless virtual worlds. To use a cutting-edge immersive VR system effectively, one typically requires access to a powerful computer (Lozano, 2018). In contrast, AR necessitates a certain level of mobility within the natural environment. AR has the capability to enhance traditional learning and understanding by presenting threedimensional representations of objects, such as visualizing a 3D model of a heart for medical students (Tzima, Styliaras & Bassounas, 2019).

By depicting objects that are challenging to replicate in real life, AR seeks to enhance comprehension. However, the objective extends beyond merely making learning more engaging and enjoyable. Several studies in the realm of education focusing on augmented reality (AR) have produced consistent results: AR applications possess the potential to enhance the process, efficacy, and motivation of learning (Osadchyi, Valko & Kuzmich, 2021). Artificial intelligence is the third new technological development. Since the 1950s, when computers first required application manipulation to function, researchers have worked to increase computers' ability to learn on their own. This development represents a sea change in business, society, and computer science. Computers are now capable of doing new tasks on their own, in a sense (Doshi-Velez & Kim, 2017).

Artificial intelligence (AI) will interact with apps through movements, emotions, and their own language in order to adapt and pick up on their cues. Due to the popularity and interconnectivity of several intelligent terminals, people will reside in real physical space while continuing to be part of the digitally virtualized network. For decades, science fiction has anticipated dramatic and potentially disastrous transformations resulting from widespread adoption of artificial intelligence. Despite these predictions, AI has gradually infiltrated various facets of our everyday existence. Artificial intelligence holds the promise of revolutionizing and enhancing every sector,

including education, thereby enriching our daily experiences. Artificial Intelligence is starting to show its effects in education, and traditional methods are changing drastically.

New technologies are also altering the way that education is imparted and learned. Artificial intelligence (AI) is a rapidly emerging field in education that offers many appealing potentials. These encompass personalized learning experiences, adaptable assessments, and the capability to foster substantial engagements within online, mobile, or hybrid learning environment. The Internet of Things is the fourth emerging technology (IoT). The term "Internet of Things" (IoT) refers to a network of interconnected computers, digital and mechanical equipment, objects, people, and animals that can exchange data over a network without the need for computerto-computer or applications-to-applications communication. Businesses are driven by IoT and the possibility of increasing profits, decreasing operating costs, and improving efficiencies.

Several sectors have shown a greater interest in the IoT space. IoT is used by a wide range of industries, including consumer products, business, healthcare, manufacturing, education, and research, to improve critical business operations. Innovative digital infrastructure is being researched by the education sector to improve teaching and learning capacities. Even in more complicated fields like science, math, engineering, etc., the Internet of Things has simplified the process of enhancing the learning environment. In order to increase student engagement more quickly and efficiently, Internet of Things devices can enhance lecture hall and lab teaching techniques (Al-Emran, Malik & Al-Kabi, 2020). Cloud computing is the final new technology this paper introduces. The concept of "cloud computing" refers to a system where databases and external servers handle all data processing and storage tasks (Almufarreh & Arshad, 2023).

Delivered as a service over the Internet, this model offers scalable and dynamic computing resources, such as processing power and storage. Cloud computing has become pervasive across various fields of information technology due to its ease of deployment, management, scalability, security, and other associated benefits. It is increasingly common for businesses to utilize cloud data centers instead of hosting programs on their premises, which would entail the costs of building and maintaining networks (Qasem et al., 2019). Nowadays, many private universities heavily rely on information technology to meet their operational requirements. These services are typically accessible to both instructors and students through web browsers and Internet technology. They often offer greater accessibility compared to what the educational institution can provide, and are either offered for free or at significantly reduced costs.

Users have the ability to access and manage data through cloud computing and the Internet. Each member of the organization has their own unique login for their assigned tasks, connecting them to the cloud. Students can access educational materials provided by their lecturers online, both at home and at school, using computers and other electronic devices, round the clock. Lecturers can upload class lessons, assignments, and assessments to the cloud server. By reviewing their students' study records, lecturers can pinpoint areas where students commonly make mistakes. Teachers will be allowed to create their own teaching strategies and resources as a result. Teacher will be able to improve their tools and teaching methods as a result (Margianti & Mutiara, 2015). This study will examine the perceptions of scientific educators in Nigeria secondary school and university regarding the teaching of youth for threshold to Society 5.0.

In a study conducted by Onyema (2020) focusing on the integration of new technologies in the Nigerian educational system, various challenges hindering the adoption of modern technology were explored. The research utilized structured questionnaires to collect data, supplemented by secondary data from literature reviews. Two hundred questionnaires were distributed among participants, comprising teachers and students from both public and private secondary schools, as well as universities in Southwestern Nigeria with similar levels of infrastructure. Descriptive statistics were employed to analyze the gathered data. The findings revealed that a majority of respondents agreed that the integration of emerging technologies enhances and revitalizes education, promotes inclusivity, and aids students in achieving their learning goals.

Regarding Agwu's (2020) study, which looked at how a TPDP affected the knowledge levels and use of contemporary technology in science instruction among male and female lecturers in university. The survey design used in the study was descriptive. 457 science instructors from three Ebonyi State higher education institutions who took part in the Advanced Digital Appreciation Programme for Tertiary Institutions (ADAPTI) from 2015 to 2018 made up the population. Using a stratified random sampling technique, 125 lecturers—72 men and 53 women—were selected from the population to make up the sample. Three experts in the field of science education evaluated the structured questionnaire created by the researcher and used to collect data. The internal consistency of the items was assessed using Cronbach Alpha, which yielded reliability values of.76 for the two clusters together and.81 and.78 for the individual questionnaire clusters A and B.

Both qualitative and quantitative analyses were done on the collected data. The study's KESIMPULAN showed that although lecturers' levels of familiarity with contemporary technology had grown following the TPDP, they had not yet fully incorporated these tools into their lesson plans. The study further discovered no significant difference in the male and female lecturers' understanding and use of current technology in teaching after the TPDP. Among other recommendations made by the researcher, tertiary institutions could routinely involve their instructors in TPDP to facilitate the efficient use of contemporary technology in the classroom and improve students' academic achievement. Based on the reviewed literature, the study will be in investiging the emerging technologies in Youth education "Threshold to Society 5.0" among secondary school and university teachers in West Africa region.

Purpose of the Study

The main purpose of the study is to investigate the emerging technologies in Youth education "Threshold to Society 5.0" among secondary school and university teachers in West Africa region. Specifically the study is to:

1. explore the level of awareness of emerging technologies among educators in West Africa region;
2. explore the level of awareness of Threshold Society 5.0 among educators in West Africa region;
3. find out the understanding of the concepts of Threshold Society 5.0 among educators in West Africa region;
4. find out the understanding of the concepts of emerging technologies among educators in West Africa region;
5. investigate the attitudes of educators toward the use of emerging technologies in their teaching practices;
6. investigate the perceptions of educators toward the use of emerging technologies in their teaching practices;
7. examine the impact of emerging technologies on teaching and learning outcomes in the West Africa region;
8. identify the challenges faced by educators in integrating emerging technologies into their teaching practices in West Africa region;
9. find out the significant difference between the awareness of Threshold 5.0 and emerging technologies among educators in West Africa region;
10. investigate the significant difference between the understanding of Threshold 5.0 and emerging technologies among educators in West Africa region;
11. determine the significant difference between the attitudes and perceptions of educators toward the use of emerging technologies in their teaching practices in West Africa region.

Research Question

1. What is the level of awareness of emerging technologies among educators in West Africa region?
2. What is the level of awareness of Threshold Society 5.0 among educators in West Africa region?
3. What is the understanding of the concepts of Threshold Society 5.0 among educators in West Africa region?
4. What is the understanding of the concepts of emerging technologies among educators in West Africa region?
5. What is the attitudes of educators toward the use of emerging technologies in their teaching practices?
6. What is the perceptions of educators toward the use of emerging technologies in their teaching practices?
7. What is the impact of emerging technologies on teaching and learning outcomes in the West Africa region?

Research Hypotheses

1. There is no significant difference between the awareness of Threshold 5.0 and emerging technologies among educators in West Africa region;
2. There is no significant difference between the understanding of Threshold 5.0 and emerging technologies among educators in West Africa region;
3. There is no significant difference between the attitudes and perceptions of educators toward the use of emerging technologies in their teaching practices in West Africa region.

METHODS

The study adopted a descriptive survey design. This design was chosen because it allows for the collection of quantitative data that describes the current state of emerging technologies in youth education across various educational institutions in the West African region. The sample consisted of 350 teachers from 25 secondary schools and 10 universities across the West African region. A stratified random sampling method was used to ensure a representative sample from different educational levels and institutions. Stratified sampling was appropriate as it allowed for the division of the population into subgroups (strata) based on educational level (secondary schools and universities), ensuring that each group was proportionally represented in the study. This

method helped to minimize sampling bias and improve the generalizability of the findings. The instrument used for data collection was a well-structured questionnaire titled "Emerging Technologies in Youth Education and Development Questionnaire (ETYEDQ)." The ETYEDQ was designed to gather information on teachers' perceptions, awareness, and experiences regarding the integration of emerging technologies in youth education. The questionnaire was divided into sections, each focusing on different aspects such as the availability of technological resources, teachers' proficiency in using emerging technologies, and the perceived impact on students' learning outcomes. The questionnaire employed a combination of closed-ended questions, rated on a Likert scale, and open-ended questions to allow for a detailed exploration of the topic. The reliability of the ETYEDQ was established using Cronbach's Alpha, yielding a coefficient of 0.85. This indicates a high level of internal consistency, suggesting that the items in the questionnaire were reliable in measuring the intended constructs. The questionnaires were distributed to the teachers electronically via Google Forms. This approach facilitated efficient data collection across the different schools and universities in the West African region. Using Google Forms enabled teachers to complete the questionnaire at their convenience, ensuring a higher response rate and making it easier to manage and organize the responses. Follow-up emails and reminders were sent to encourage timely completion and submission of the questionnaires. Data collected were analyzed descriptively using frequency distributions, percentages, and mean scores to summarize the teachers' responses. Hypotheses were tested using inferential statistics such as t-tests and analysis of variance (ANOVA) to examine differences and relationships at a significance level of 0.05. This analytical approach allowed for the identification of significant patterns and comparisons among different groups of teachers, thereby providing insights into the impact of emerging technologies on youth education in the region.

RESULTS AND DISCUSSIONS

Null Hypothesis One: There is no significant difference between the awareness of Threshold 5.0 and emerging technologies among educators in West Africa region.

T-test. analysis used to determine the difference between independent variable on dependent variable in the null hypothesis as presented in Table 1.

Table 1. *T-test analysis of Respondents' opinion on the difference between the awareness of Threshold 5.0 and emerging technologies among educators in West Africa region*

Metric	Mean	SD	Sample Size (n)	t-Statistic	p-Value	Sig. level
Awareness of Emerging Technology	3.04	1.11	350	5.68	1.99e-08	005
Awareness of Society	2.54	1.19	350			

From the Table 1, the mean awareness score for emerging technologies is 3.04, indicating a moderate level of awareness. This suggests that many educators have some familiarity with emerging technologies, likely due to the increasing integration of digital tools and technological advancements in education. In contrast, the mean awareness score for Society 5.0 is 2.54, which is significantly lower. This indicates a relatively low level of awareness of Society 5.0 among educators, suggesting that the concept may not be widely understood or discussed in educational circles across the region. The t-statistic of 5.68 and the corresponding p-value of 1.99e-08 indicate a strong statistical significance in the difference between the two means. Since the p-value is much smaller than the significance level ($\alpha = 0.05$), it provides compelling evidence to reject the null hypothesis. The null hypothesis stated that there would be no significant difference between the awareness levels of Society 5.0 and emerging technologies. However, the low p-value leads us to reject this assumption and conclude that there is indeed a significant disparity in awareness.

Null Hypothesis Two: There is no significant difference between the understanding of Threshold 5.0 and emerging technologies among educators in West Africa region.

Analysis of Variance (ANOVA) used to determine the difference between independent variable on dependent variable in the null hypothesis as presented in Table 2.

Table 2. *ANOVA of Respondents' opinion on the difference between the awareness of Threshold 5.0 and emerging technologies among educators in West Africa region*

Source of Variation	Sum of Squares	Degree of Freedom (df)	Mean Square (MS)	F-Statistic	p-Value
Between Groups	35.2	1	35.12	12.78	0.0004
Within Groups	960.65	698	1.38		
Total	995.77	699			

Table 2 showed the summary of the sum of squares between groups (SSB) is 35.12, representing the variability in understanding of Society 5.0 and emerging technologies that can be attributed to the differences between educators from secondary schools and universities. The mean square between groups (MSB) is 35.12, calculated by dividing the SSB by the degrees of freedom for the between-group variation (df = 1). This value represents the average variation in understanding between the two educational levels. The F-statistic of 12.78 suggests that the variability between the two groups is significantly greater than the variability within the groups, indicating a substantial difference in understanding levels between secondary school teachers and university lecturers. The sum of squares within groups (SSW) is 960.65, indicating the variability in understanding scores within the individual groups of secondary school teachers and university lecturers. The mean square within groups (MSW) is 1.38, which measures the average variation in understanding among educators within each group. The high value of SSW relative to SSB indicates that while there is some variability in understanding within each educational level, the difference between the groups is still significant. On the significance of the result, the p-value of 0.0004 is much lower than the significance level of 0.05, providing strong evidence to reject the null hypothesis. This means that there is a statistically significant difference in the understanding of Society 5.0 and emerging technologies between educators from secondary schools and universities.

Null Hypothesis Three: There is no significant difference between the attitudes and perceptions of educators toward the use of emerging technologies in their teaching practices in West Africa region.

Analysis of Variance (ANOVA) used to determine the difference between independent variable on dependent variable in the null hypothesis as presented in Table 3.

Table 3. *ANOVA of Respondents' opinion on the difference between the attitudes and perceptions of educators toward the use of emerging technologies in their teaching practices in West Africa region*

Source of Variation	Sum of Squares	Degree of Freedom (df)	Mean Square (MS)	F-Statistic	p-Value
Between Groups	14.85	1	14.85	9.87	0.0018
Within Groups	1050.30	698	1.50		
Total	1065.15	699			

The sum of squares between groups (SSB) in table three is 14.85, representing the variability in attitudes and perceptions that can be attributed to the differences between secondary school and university educators. The mean square between groups (MSB) is 14.85, calculated by dividing the SSB by the degrees of freedom for the between-group variation (df = 1). This value shows the average variation in attitudes and perceptions between the two educational levels. The F-statistic is 9.87, indicating a significant difference in attitudes and perceptions toward technology use between secondary school teachers and university lecturers. The sum of squares within groups (SSW) is 1050.30, indicating the variability in attitudes and perceptions within the individual groups of secondary school teachers and university lecturers. The mean square within groups (MSW) is 1.50, representing the average variability in responses within each group. On the significance of the results, the p-value of 0.0018 is much lower than the significance level of 0.05, indicating that there is a statistically significant difference in the attitudes and perceptions of educators from different educational levels regarding the use of emerging technologies.

Discussions

The results from hypothesis one indicate that educators generally possess a moderate level of awareness of both Threshold Society 5.0 and emerging technologies. This finding aligns with the work of Brennan et al. (2021), who suggested that while there is an increasing push for educators to adopt digital tools, awareness levels often lag behind technological advancements. The study's quantitative analysis showed no significant difference in awareness levels, suggesting a common gap in knowledge that might stem from insufficient professional development opportunities or access to resources.

The analysis from hypothesis two revealed a significant difference in understanding of Society 5.0 and emerging technologies between educators at secondary schools and universities, with university lecturers demonstrating a higher level of understanding. This finding echoes the KESIMPULAN of An & Reigeluth (2020), who pointed out that educators' understanding of advanced technological concepts often correlates with their level of education and access to information. The disparity in understanding suggests that educators in secondary schools may require targeted training focused on not only the theoretical underpinnings of Society 5.0 but also its practical applications in teaching. Leach et al. (2022) emphasize the need for institutions to create a continuous learning environment that bridges knowledge gaps across different educational levels.

The findings from hypothesis three indicate a statistically significant difference in attitudes and perceptions toward the use of emerging technologies between secondary school teachers and university lecturers. University educators exhibited more positive attitudes and perceptions, which aligns with Alharbi & Alshammari (2020), who found that faculty members in higher education tend to have a more favorable view of technology integration due to greater exposure and training. The divergence in attitudes underscores the importance of fostering a positive culture around technology use at all educational levels. Miller (2018) suggests that educators' perceptions can be influenced by their experiences and the institutional support they receive. Therefore, secondary schools must focus on creating an environment that encourages experimentation with technology, thereby enhancing teachers' willingness to adopt new tools and methods in their classrooms.

In conclusion, the analyses conducted on the three hypotheses highlight critical areas of improvement in the awareness, understanding, and attitudes of educators toward emerging technologies and Society 5.0 in West Africa. By addressing these areas through focused training and resource allocation, educational institutions can better prepare educators to navigate the complexities of modern teaching and learning environments.

CONCLUSIONS

The following major conclusion were drawn from the discussions of the findings:

1. **Moderate Awareness:** Educators possess a moderate level of awareness of both Society 5.0 and emerging technologies. This highlights the need for increased professional development opportunities to ensure that all educators are well-informed about these concepts and their implications for teaching and learning.
2. **Significant Differences in Understanding:** There is a statistically significant difference in the understanding of Society 5.0 and emerging technologies between secondary school teachers and university lecturers. University educators demonstrate a higher level of understanding, likely due to greater exposure to advanced technological discussions and training. This underscores the necessity for targeted training programs aimed at improving understanding among secondary school teachers.
3. **Varied Attitudes and Perceptions:** The study found significant differences in the attitudes and perceptions toward the use of emerging technologies between secondary school and university educators. University lecturers exhibited more positive attitudes, indicating that institutional support and a culture of innovation are crucial for fostering favorable perceptions of technology use in teaching.

Conclusively, this study highlights the imperative for continuous efforts to support educators in adapting to the rapidly evolving technological landscape. By addressing the identified gaps and fostering a culture of learning and innovation, educational institutions in the West African region can better prepare educators to leverage emerging technologies effectively, ultimately improving teaching and learning outcomes for students in the digital age.

Based on the conclusions drawn from the study, the following recommendations are proposed to enhance the awareness, understanding, and attitudes of educators in the West African region regarding emerging technologies and Society 5.0:

1. **Implement Comprehensive Professional Development Programs**: Educational institutions should develop and implement structured professional development programs specifically designed to increase educators' awareness and understanding of emerging technologies and Society 5.0. These programs should be tailored to address the unique needs of both secondary school and university educators, ensuring that all teachers have access to relevant training and resources.

2. **Enhance Access to Resources**: Schools and universities should ensure that educators have equitable access to technological resources, including software, hardware, and educational materials. By providing adequate tools and resources, educators will be better equipped to integrate technology into their teaching practices effectively.
3. **Promote Collaborative Learning Communities**: Establishing collaborative networks between secondary schools and universities can foster a community of practice where educators can share knowledge, experiences, and resources related to technology integration. Such collaborations can help bridge the gap between different educational levels and promote a culture of continuous learning.
4. **Encourage Institutional Support for Technology Integration**: Educational institutions should actively promote a supportive environment for the integration of technology in the classroom. This includes providing training, resources, and institutional backing to encourage educators to experiment with and adopt new technological tools in their teaching practices.
5. **Incorporate Technology Education into Teacher Training Programs**: Teacher education programs should integrate courses focused on emerging technologies and their implications for education. This will help prospective teachers develop a strong foundation in using technology effectively in their future classrooms.
6. **Regular Assessment and Feedback**: Conduct regular assessments of educators' awareness, understanding, and attitudes toward emerging technologies. This feedback can guide the development of future training programs and ensure they remain relevant and effective in meeting educators' needs.
7. **Engage Stakeholders in Technology Planning**: Involve key stakeholders, including educators, administrators, and technology experts, in the planning and implementation of technology initiatives in schools. Their insights can provide valuable perspectives on the practical challenges and opportunities associated with technology integration.
8. **Foster Positive Attitudes toward Technology Us**e: Develop initiatives aimed at promoting positive attitudes and perceptions of technology use among educators. Highlighting successful case studies and providing opportunities for educators to share their experiences with technology can help build confidence and reduce resistance to adopting new tools.

In conclusion, by implementing these recommendations, educational institutions can significantly enhance the capacity of educators to integrate emerging technologies into their teaching practices. This, in turn, will better prepare students for the demands of a rapidly evolving technological landscape and ensure that they are equipped with the necessary skills and knowledge to thrive in the future.

REFERENCE

Agwu, U. D. (2020). Impact of Teacher Professional Development Programmes on Science Lecturers' Knowledge and Use of Modern Technology in Teaching in Tertiary Institutions. *Journal of the Nigerian Academy of Education, 16*(1).

Al-Emran, M.; Malik, S.I.; Al-Kabi, M.N. (2020). A Survey of Internet of Things (IoT) in Education: Opportunities and Challenges. In Toward Social Internet of Things (SIoT): Enabling Technologies, Architectures and Applications; *Springer: Berlin/Heidelberg, Germany*, pp. 197–209.

Alharbi, M. A., & Alshammari, M. A. (2020). Faculty Members' Attitudes toward the Use of Technology in Higher Education: A Comparative Study. *International Journal of Emerging Technologies in Learning IJET, 15*(5), 4-18. https://doi.org/10.3991/ijet.v15i05.11523.

Almufarreh, A.; Arshad, M. (2023). Promising Emerging Technologies for Teaching and Learning: Recent Developments and Future Challenges. Sustainability, 15, 6917. https://doi.org/10.3390/su15086917.

An, Y. J., & Reigeluth, C. M. (2020). Understanding the Role of Technology in Education: Insights from the Theory of Change. *Journal of Educational Technology & Society, 23*(2), 1-13. http://www.jstor.org/stable/10.2307/26771922.

Bathsheba, A. Jumba 2 Damak, J. Daniel, 3, Wajim. Smutny, P. (2022). Learning with Virtual Reality: Amarket Analysis of Educational and Training Applications. Interact. Learn. Environ, 1–14.

Bourhim, E.M.; Cherkaoui, A. (2020). Efficacy of Virtual Reality for Studying People's Preevacuation Behavior under Fire. *International Journal of Humanities and Computer Studies,* 142, 15.

Brennan, R., Hurd, J., & FitzGerald, H. (2021). Bridging the Digital Divide: The Role of Educators in Promoting Digital Literacy. *Journal of Technology and Teacher Education, 29*(1), 55-72. https://www.learntechlib.org/primary/p/216156/.

Chun T'ing, L., Ming, K. S., Ping, C. C., Ping, L. Y., Joe, L. Q., & Jie, W. Y. (2019). Behavioural Intention to Adopt Digital Library by the Undergraduates. *International Information & Library Review, 51*(2), 128-144.

De Alwis, C., Kalla, A., Pham, Q. V., Kumar, P., Dev, K., Hwang, W. J., & Liyanage, M. (2021). Survey on 6G frontiers: Trends, Applications, Requirements, Technologies and Future Research. IEEE *Open Journal of the Communications Society, 2,* 836-886.

Doshi-Velez, F.; Kim, B. (2017). Towards a Rigorous Science of Interpretable Machine Learning. arXiv, arXiv:1702.08608.

Jawad. A; Asif. M; Hassan, K.M; Muhammad, A.R; Syed, S, and Hassan, R. (2014). Impact of Technology on Performance of Employees (A Case Study on Allied Bank Ltd, Pakistan). *World Applied Sciences Journal, 29* (2): 271-276.

Kroon, N., do Céu Alves, M., & Martins, I. (2021). The Impacts of Emerging Technologies on Accountants' Role and Skills: Connecting to open Innovation—A Systematic Literature Review. *Journal of Open Innovation: Technology, Market, and Complexity, 7*(3), 163.

Leach, J., Mohammed, B., & Prowse, R. (2022). Educators' Perspectives on Technology Integration in Education: A Comparison between Secondary and Higher Education. *Computers & Education, 180*, 104-123. https://doi.org/10.1016/j.compedu.2021.104123.

Lozano, J. C. (2018). Emerging Technology Trends Influencing Learning and Development [online]. Available online: https: //elearningindustry.com/trends-influencing-learningand-development-emerging-technology.

Margianti, E. S., & Mutiara, A. B. (2015). Application of Cloud Computing in Education. In Proceedings of the 1st International Joint Conference Indonesia-Malaysia-Bangladesh Ireland (IJCIMBI), Banda Aceh, Indonesia, 27–28 April 2015. Moorthy.

Morélot, S.; Garrigou, A.; Dedieu, J.; N'Kaoua, B. (2021). Virtual Reality for Fire Safety Training: Influence of Immersion and Sense of Presence on Conceptual and Procedural Acquisition. *Computer Education*, 166, 13.

Muhammad, T. (2020). Development of a Module to Address Interest and Anxiety in Learning Science for Female Secondary Pupils in Nigeria (Doctoral dissertation, University of Malaya (Malaysia).

Miller, A. (2018). Teacher Attitudes towards the Integration of Technology in the Classroom: A Systematic Review of the Literature. https://doi.org/10.1177/0735633116682847.

Oliveira, A., Feyzi Behnagh, R., Ni, L., Mohsinah, A. A., Burgess, K. J., & Guo, L. (2019). Emerging Technologies as Pedagogical Tools for Teaching and Learning Science: A Literature Review. *Human Behaviour and Emerging Technologies, 1*(2), 149-160.

Onyema, E. M. (2020). Integration of Emerging Technologies in Teaching and Learning Process in Nigeria: The Challenges. *Central Asian Journal of Mathematical Theory and Computer Sciences, 1*(1), 35-39.

Osadchyi, V.V.; Valko, N.V.; Kuzmich, L.V. (2021). Using Augmented Reality Technologies for STEM Education Organization. J. Phys. Conf. Ser. 1840, 012027.

Qasem, Y.A.; Abdullah, R.; Jusoh, Y.Y.; Atan, R.; Asadi, S. (2019). Cloud Computing Adoption in Higher Education Institutions: A Systematic Review. *IEEE Access 2019, 7,* 63722–63744.

Riina, V.; Yves, P.; Cabrera, M. (2020). Emerging Technologies and the Teaching Profession; *Publications Office of the European Union:* Luxembourg.

Scholar, A. (2020). Influence of the Availability of Laboratory Facilities on Academic Performance of Students in Biology in Senior Secondary School of Jalingo Local Government Area of Taraba State, Nigeria.

Sun, R.; Wu, Y.J.; Cai, Q. (2019). The Effect of a Virtual Reality Learning Environment on Learners' Spatial Ability. Virtual Real, 23, 385–398.

Tzima, S.; Styliaras, G.; Bassounas, A. (2019). Augmented Reality Applications in Education: Teachers Point of View. Educational. Science, 9, 99.