

**Emerging Technologies and Adaptability as Correlate of Curriculum Design and Innovation of Industrial Technology Teachers of Colleges of Education (Technical) in Northern Nigeria**

By

<sup>1</sup>Sale, Nimrod Kamo, <sup>2</sup>Murtla Musa & <sup>3</sup>Abdulrasheed Ibrahim Baba

<sup>1</sup> WOODWORK DEPARTMENT, SCHOOL OF TECHNICAL EDUCATION  
FEDERAL COLLEGE OF EDUCATION, GIDAN-MADI, SOKOTO STATE

<sup>2</sup> BUILDING DEPARTMENT, SCHOOL OF SECONDARY EDUCATION (TECHNICAL)  
FEDERAL COLLEGE OF EDUCATION, BICHI, KANO STATE

<sup>3</sup> DEPARTMENT OF EDUCATION TECHNICAL, KANO STATE POLYTECHNIC  
+2348026786350; salenimrodkamo@fcegmn.edu.ng

**Abstract**

*The study was carried out to determine Emerging Technologies and Adaptability as Correlate of Curriculum Design and Innovation of Industrial Technology Teachers of Colleges of Education (Technical) in Northern Nigeria. A structured questionnaire was used as the instrument for data collection with 84 items. The instrument is based on five-point Likert scale. The instrument was subjected to face validation by five experts. Cronbach alpha reliability method was used to establish the internal consistency of the instrument 0.81 was obtained. The design of the study was correlation research design. The population size was 98 Industrial Technology Teachers in Federal Colleges of Education (T) Bichi, Gusau, Gombe and G-madi. Data were analyzed using SPSS version 25. The results showed that 1. A very strong and positive correlation exists between Emerging Technologies and adaptability of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria. 2. A very strong and positive correlation exists between Emerging Technologies and curriculum design of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria. 3. A very strong and positive correlation exists between Emerging Technologies and curriculum innovation of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria. The following recommendation were made that the findings should 1. Be integrated into Curriculum Design for Industrial Technology Education. The study concludes that the implementation of emerging technologies in technology education underscores the necessity for ongoing professional development for educators, ensuring they remain informed about technological trends and pedagogical strategies.*

**Keywords:** Emerging Technologies, Teachers, Adaptability, Curriculum Design, Innovation

**Introduction**

Technical, Vocational Education and Training (TVET) stands as a cornerstone in the development of skilled workforces worldwide. In the face of rapid globalization and technological advancements, the landscape of work is changing at an unprecedented pace. Lanre-Babalola, Oginni, Ajibola, Olowu, Balogun, Tewogbade & Gbotosho (2023) and Aluko & Adeyemi (2023). emphasizes on holistic development of TVET Teachers and stresses on transformative technical, vocational education and training for skill development. To bridge the gap between traditional education and the demands of the modern workforce, the integration of emerging technologies and adaptability in TVET is imperative. This article will provide insight to the policy makers and help the vocational teachers in colleges of education to have an understanding of implementing and using these emerging technologies to teach vocational subjects in colleges of education technical.

Emerging technologies are new or evolving technologies that are poised to have a significant impact on society. These technologies are often characterized by their potential to disrupt existing industries, create new markets, and solve complex problems. Some of the most promising emerging technologies include Virtual Reality (VR), Augmented Reality (AR) Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), Robotics and Automation, Big data and analytics, Blockchain and distributed ledger technology, 3D printing and additive manufacturing (Kabir & Kabir 2019). These technologies have the potential to revolutionize fields such as healthcare, education, transportation, and manufacturing. Emerging technologies are a powerful force for change in curriculum design and innovation. These technologies have the potential to improve technology teachers lives in many ways, but it is important to use them wisely and responsibly (Abubakar 2018). Benefits of Emerging Technologies in Technical Vocational Education and Training is increasingly used to enhance learning experiences. It has shown its capacity to foster an enabling environment along with institutional wide engagement (Ayamga, Lawani, Akaba & Birindwa 2023). In exploring the use of emerging technologies in vocational education. For example, a study has found that using virtual reality (VR) to train teachers for woodwork tasks resulted in significant improvements in

performance and confidence (Okwori, Kareem & Abutu 2019). Another study found that using augmented reality (AR) to train teachers for plumbing tasks resulted in reduced errors and increased completion rates (Goodluck 2021). The impact of emerging technologies on society, business, economy, and humanity is only going to increase in the coming decades (Agri, Kennedy, Bonmwa, & Acha 2018). Virtual Reality (VR) and Augmented Reality (AR) applications, have revolutionized the learning experience by providing immersive and interactive training environments. In vocational education, teachers can utilize VR to simulate complex tasks in a risk-free setting, enhancing their understanding of intricate concepts. Research has shown that with VR simulation, learning can be personalized to suit individual learning needs and provide adaptive learning experience (Adewusi, Al Hamad, Adeleke, Nwankwo, & Nwokocha 2023). AR, on the other hand, overlays digital information onto the real world, enabling teachers to visualize and manipulate objects, making learning more engaging and tangible. Artificial Intelligence (AI) and Machine Learning (ML) in Skill Enhancement AI and ML technologies empower personalized learning experiences. However, Machine Learning algorithms, when applied to vocational tasks, help teachers refine their skills by analyzing patterns, thereby enhancing their expertise. For instance, in automotive repair training, IoT sensors can monitor engine performance, allowing teachers to diagnose issues and apply solutions in a controlled adaptive environment.

Adaptability in the context of emerging technologies refers to the ability of Industrial Technology Teachers and Colleges of Education (Technical) to adjust and thrive amidst rapid technological changes. Continuous Learning to remain adaptable, Industrial Technology Teachers must cultivate a mindset of lifelong learning. According to Ogwo, Ibegbulem, & Nwachukwu (2023). Adaptability involves actively seeking out new knowledge and skills related to emerging technologies, such as artificial intelligence, virtual reality, and machine learning. Engaging with various learning resources—like online courses, webinars, and peer collaborations—can enhance one's ability to adapt effectively (Mohammed, & Abdulhamid 2021). Adaptable mindset encourages Industrial Technology Teachers to view challenges as

opportunities for growth rather than obstacles. By fostering curiosity and resilience, individuals can better navigate the uncertainties associated with new technologies (Lee & Jung 2021). Adaptability also involves a willingness to experiment with new technologies and building a network of support that can significantly enhance sharing experiences and insights with colleagues and mentors. Colleges of Education (Technical) must find a balance between maintaining legacy systems and adopting new technologies. Ogunboye (2023) opined that This requires careful planning to ensure that transitions are smooth and that Industrial Technology Teachers are equipped with the necessary skills to adapt to new tools. As Industrial Technology Teachers and Colleges of Education (Technical) adapt to new technologies, it is crucial to consider the ethical implications of these technologies. Understanding the broader impact of technology on society can guide responsible and informed decision-making (Omekwu, Ugwu & Ejikeme 2023). Adaptability to emerging technologies is a multifaceted concept that encompasses continuous learning, a growth mindset, experimentation, collaboration, and ethical considerations of its effects on curriculum design.

Curriculum design for Industrial Technology teachers in Colleges of Education is increasingly influenced by the need to adopt emerging technologies. This adaptation is essential for preparing future educators to effectively teach students in a rapidly evolving technological landscape. As postulated by Olatunde-Aiyedun (2024) Curriculum design must incorporate emerging technologies such as artificial intelligence, robotics, and advanced manufacturing tools. This integration allows teachers to provide students with relevant skills that align with current industry standards. Adopting innovative frameworks such as Backward Design and Understanding by Design (UbD) encourages educators to start with desired outcomes and work backward to develop the curriculum. This approach ensures that the curriculum is aligned with the skills and knowledge students need to acquire, fostering critical thinking and problem-solving abilities that are essential in technology education (Okolie, Igwe, Mong, Nwosu, Kanu & Ojemuyide 2022). Curriculum design for Industrial Technology should prioritize experiential learning opportunities. This includes project-based learning, where students engage in real-world

projects that apply their knowledge and skills. Such approaches not only enhance engagement but also help students develop practical skills that are directly applicable in their future careers (Okolie, Igwe, Nwosu, Eneje, & Mlanga 2020). To effectively implement a technology-integrated curriculum, ongoing professional development for teachers is crucial. Industrial Technology teachers as stated by Enang & Okute (2019) must be equipped with the latest knowledge and skills regarding emerging technologies and innovative teaching methods. This can be facilitated through workshops, seminars, and collaborative learning opportunities that focus on curriculum development and technology integration. Collaboration among educators, industry professionals, and curriculum developers is vital for creating a relevant and effective curriculum design for robust assessment and innovative strategies that reflect the skills and competencies expected to achieve.

Curriculum innovation refers to the process of revising and updating educational programs to incorporate new knowledge, skills, and technologies. For Industrial Technology teachers, this means integrating emerging technologies such as artificial intelligence, robotics, and digital fabrication tools into the curriculum. Curriculum innovation is vital for equipping students with the competencies needed in modern industries, fostering creativity, problem-solving skills, and adaptability (Adegbite & Muibi, 2021). Curriculum Innovation provides continuous training opportunities for teachers essentially through workshops, seminars, and courses focused on emerging technologies that enable educators to stay current with technological advancements and pedagogical strategies. According to Ebekoziem, Aigbavboa, & Aliu (2023) Building partnerships with industry stakeholders allows educational institutions to align their curriculum with real-world demands. Industry input can guide the development of relevant content and ensure that students gain hands-on experience with the latest technologies and practices. Project-based learning within the curriculum promotes active engagement and practical application of knowledge. This approach allows students to work on real-world problems, fostering critical thinking and collaboration skills essential for success in the technology sector (Oviawe & Uwameiye 2020). Integrating Artificial Intelligence and data

analytics into the curriculum can personalize learning experiences and enhance student engagement. Also, utilizing Virtual and Augmented Reality can create immersive learning experiences that enhance understanding of complex concepts in Industrial Technology. These technologies allow students to visualize and interact with content in ways that traditional methods cannot provide (Egielewa, Iyalomhe, & Cirella 2022). Implementing adaptive learning platforms can tailor educational experiences to individual student needs, ensuring that all learners can progress at their own pace. Industrial Technology teachers face difficulties in accessing resources, training, and support for implementing new technologies.

Industrial Technology teachers are involving in curriculum innovation revising and updating educational programs to incorporate new knowledge, skills, and technologies. For Industrial Technology teachers, this means integrating emerging technologies such as artificial intelligence, virtual reality, and digital fabrication tools into the curriculum (Onyema 2020). This innovation is vital for equipping students with the competencies needed in modern industries, fostering creativity, problem-solving skills, and adaptability. Project-based learning allows students to work on real-world problems, fostering critical thinking and collaboration skills. Incorporating emerging technologies into these projects enhances the learning experience and better prepares students for the workforce (Enang 2022). Industry input can guide the development of relevant content and ensure that students gain hands-on experience with the latest technologies and practices. Also, continuous professional development opportunities for Industrial Technology teachers are crucial for staying current with technological advancements and pedagogical strategies. Workshops, seminars, and courses focused on emerging technologies enable educators to effectively integrate new tools and methods into their teaching practices. (Onojah, Onojah, & Ala (2022) noted that implementing adaptive learning technology supports differentiated instruction and helps address diverse learning styles. While integrating emerging technologies presents numerous opportunities, Educators face difficulties in accessing resources, training, and support for implementing new technologies in college of education (technical).

Federal Colleges of Education (Technical) in Nigeria are tertiary institutions established by the federal government to produce qualified teachers in technical, vocational, business and science subjects. These colleges play a vital role in advancing technological education in the country. The primary mandate of Federal Colleges of Education (Technical) is to offer Nigeria Certificate in Education (NCE) programs in technical, vocational, business, science and primary education subjects (Kola & Opeyemi 2021). The goal is to produce qualified and dynamic teachers who can effectively perform their roles in the education system and fit into the world of work. These colleges according to Babatunde, Chukuwuemeka, Abdulrahim & Adai (2019).) offer a range of academic programs at both NCE and degree levels. They provide relevant courses and programs that cater to the needs of the education sector and the labor market. Some of the programs include; NCE in Technical, Vocational and Business Subjects, NCE in Science Education, NCE in Primary Education and Degree programs in chosen fields of study. Federal Colleges of Education (Technical) strive to provide world-class learning facilities to enhance the educational experience of their students. They are equipped with well-equipped laboratories, state-of-the-art equipment, and innovative technologies to facilitate cutting-edge research and practical learning (Essien & Ntui 2024). To ensure the relevance and effectiveness of their programs, Federal Colleges of Education (Technical) collaborate with industry stakeholders. This collaboration helps align their curriculum with real-world demands and provides students with opportunities for hands-on experience with the latest technologies and practices but Educators face difficulties in accessing resources, training, and support for implementing new technologies.

### **Statement of the problem**

Education is the instrument for social transformation of a people. It is the vehicle for transferring values, entire, knowledge and experience that make for proper molding and adjustment of an individual to his dynamic environment. Inclusion of emerging technologies to achieve such laudable objectives, the use of the instrumentality of curriculum is adequate. The



curriculum is designed to accommodate educational systems and contains the aspirations, projections and dream of the inhabitants of the system. The contents of a function of the cultural demands of the society needs to be adaptable, on it are the general education components which complements specific elements in giving a well-balanced education to its recipients so as to play relevant roles in the society. Curriculum is designed as all the learning experiences that the learner acquired under the guidance of schools directed towards acquiring some innovation, skills or competences. The learning process of a child is aided by the use of learning materials and resources available.

Unfortunately, it has been observed that no meaningful learning can take place without the use of learning aids. In colleges of education (technical) northern Nigeria, the Ministry of Education faces the problem of not being able to make the necessary learning resources available to all educational institutions. There are too many cases of teachers and educators facing difficulties in accessing resources, training, and support for implementing new technologies. Especially in rural areas, teachers are not able to afford the basic learning tools they needed. This is a huge problem that hampers the process of curriculum design, innovation and adaptability. Most colleges of education (technical) are in a poor state as regards the emerging technologies and conditions of the school environment. The world is becoming more technologically advanced and the educational sector however in Nigeria has not moved with the pace. Most schools in Nigeria do not have modern facilities and so the teachers are not adjusted in world standards.

### **Purpose of the Study**

The main purpose of the study is to determine the relationship between emerging technologies and adaptability as correlate curriculum design and innovation of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria. Specifically, the study will determine the influence between;



1. Emerging technologies on Adaptability of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria.
2. Emerging technologies on Curriculum design of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria.
3. Emerging technologies on Curriculum innovation of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria.

### **Research Question**

The following research questions were formulated to guide the study:

1. What is the influence of Emerging technologies on Adaptability of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria?
2. What is the influence of Emerging technologies on Curriculum design of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria?
3. What is the influence of Emerging technologies on Curriculum innovation of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria?

### **Hypotheses**

1. There is no significant correlation on the influence of Emerging technologies on Adaptability of Industrial Technology Teachers
2. There is no significant correlation on the influence of Emerging technologies on Curriculum design of Industrial Technology Teachers
3. There is no significant correlation on the influence of Emerging technologies on Curriculum innovation of Industrial Technology Teachers

### **Method**

The design of the study was correlation survey research. The area of the study is drawn from four federal Colleges of Education in Northern Nigeria; which comprises of Federal College of Education (Technical) Gombe, Federal College of Education (Technical) Bichi, Federal College of Education (Technical) Putiskum and Federal College of Education (Technical) Gusau. The population for the study was 98 industrial technology teachers. The entire population of industrial technology teachers were used for the study. This is because population is manageable and sampling was not required. The instrument for data collection was a structured questionnaire, emerging technologies, adaptability, curriculum design and curriculum innovation were developed by the researcher. The questionnaire was titled Emerging Technologies, Adaptability, Curriculum Design and Curriculum Innovation Questionnaire (ETACDCIQ) with 84 items. the questionnaire consists of two sections, A-B. Section A deals with the personal data of the respondents while section B has three clusters. Cluster 1 contained 21 items on influence of emerging technologies among Industrial Technology Teachers. Cluster 2, 21 items on influence of adaptability among Industrial Technology Teachers. Cluster 3, 21 items on influence of curriculum design among Industrial Technology Teachers. Cluster 4, 21 items on influence of curriculum innovation among Industrial Technology Teachers. The instrument is based on five-point rating scale of Strongly Agree (SA) 5, Agree (A) 4, Undecided (U) 3, Disagree (D) 2 and Strongly Disagree (SD) 1. The instrument was subjected to face validation by five experts, three in the Department of Industrial Technical Education, University of Nigeria, Nsukka, one from the Department of Computer and Robotics Education, University of Nigeria, Nsukka and one from School of Technical Education, FCE (T) Bichi. Each validate was served with a copy of the questionnaire and requested to identify ambiguities and proffer suggestions for improving the instrument towards meeting the objective of the study. The experts' suggestions were taken into consideration in the final draft of the questionnaire. The instrument was administered on 15 Industrial Technology Teachers in Enugu State. In South East Nigeria which is not part of the respondents used for the study, but offers Industrial Technical Education at Technical college level. For the purpose of obtaining the internal consistency of the

instrument, Cronbach alpha reliability was used and reliability coefficient of 0.81 was obtained as the overall reliability value for the entire questionnaire items. Copies of the questionnaire were administered on the Industrial Technology Teachers, personally with the help of four research assistants. The research assistants were briefed and involved in data collection. They reside in the state under their coverage to ensure accessibility to the respondents. These research assistants administer the questionnaire to the respondents and collect them back after one week. The data generated for this study was analyzed using statistical package for social science (SPSS) version 25. The research questions were analyzed using Pearson product moment correlation (r). Pearson product correlation analysis was used to ascertain the significant relationship among variables of the study. The responses to the items were interpreted by describing the strength of the correlation using the guide suggested by Agbo (2010) for the absolute value of r as slated below; Very Weak Relationship = 0.00 – 0.19, Very Weak Relationship = 0.20 – 0.39, Moderate relationship = 0.40 – 0.59, Strong Relationship = 0.60 – 0.79, Very Strong Relationship = 0.80 – 1.00. regression analysis was used to test the null hypotheses at 0.05 level of significance.

## **Results**

### **Research Question 1**

What are the relationships between Emerging technologies and Adaptability of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria?

#### **Cluster A: Bivariate Correlation between Emerging technologies and Adaptability**

##### **Correlations**

Variables		Emerging Technologies	Adaptability
Pearson Correlation	1. Emerging Technologies	1.000	.963
	2. Adaptability	.963	1.000

N	Emerging Technologies	98	98
	Adaptability	98	98

Data in cluster 1 depict the correlation between emerging technologies and adaptability of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria. It can be observed that there is a positive relationship between their emerging technologies and adaptability, the cluster also shows the correlation between the two variables. It can be observed that there was a very strong correlation (.963) between the emerging technologies and adaptability of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria. The positive correlation also depicts the direction of the relationship, this implies that the variables move in the same direction to each other. This implies that when emerging technologies increases, adaptability Industrial Technology Teachers also increases. Therefore, if emerging technologies such as Artificial Intelligence (AI) and Virtual Reality (VR) is increased the adaptability of Industrial Technology Teachers also increases, but if is reduced their adaptability also reduces.

### Research Question 2

What are the relationships between Emerging technologies and Curriculum Design of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria?

### Cluster B: Bivariate Correlation between Emerging technologies and Curriculum Design Correlations

Variables		Emerging Technologies	Curriculum Design
Pearson	1. Emerging Technologies	1.000	.827
Correlation	2. Curriculum Design	.827	1.000
N	Emerging Technologies	98	98
	Curriculum Design	98	98

Data in cluster B portray the correlation between emerging technologies and curriculum design of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria. It can be seen that there is a positive relationship between their emerging technologies and curriculum design, the cluster also displays the correlation between the two variables. It can be observed that there was a very strong correlation (.827) between the emerging technologies and curriculum design of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria. The positive correlation also depicts the direction of the relationship, this suggests that the variables move in the same direction to each other. This indicates that when emerging technologies increases, curriculum design of Industrial Technology Teachers also increases. Therefore, if emerging technologies such as Artificial Intelligence (AI) and Virtual Reality (VR) is increased the curriculum design of Industrial Technology Teachers also increases, but if is reduced their curriculum design also reduces.

### **Research Question 3**

What are the relationships between Emerging technologies and Curriculum Innovation of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria?

### **Cluster C: Bivariate Correlation between Emerging technologies and Curriculum Innovation**

Correlations			
Variables		Emerging Technologies	Curriculum Innovation
Pearson	1. Emerging Technologies	1.000	.836
Correlation	2. Curriculum Innovation	.836	1.000
N	Emerging Technologies	98	98
	Curriculum Innovation	98	98

Data in cluster C represent the correlation between emerging technologies and curriculum Innovation of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria.

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Nigeria. It can be seen that there is a positive relationship between their emerging technologies and curriculum innovation, the cluster also displays the correlation between the two variables. It can be observed that there was a very strong correlation (.836) between the emerging technologies and curriculum innovation of Industrial Technology Teachers in colleges of education (technical) in northern Nigeria. The positive correlation also depicts the direction of the relationship, this suggests that the variables move in the same direction to each other. This indicates that when emerging technologies increases, curriculum innovation of Industrial Technology Teachers also increases. Therefore, if emerging technologies such as Artificial Intelligence (AI) and Virtual Reality (VR) is increased the curriculum innovation of Industrial Technology Teachers also increases, but if is shortened their curriculum design also diminishes.

### Testing of Hypotheses

#### Hypotheses 1

There is no significant correlation on the influence of Emerging technologies on Adaptability of Industrial Technology Teachers

Data for testing hypothesis 1 are presented in cluster 4

#### Cluster 4: Model Summary of Regression Analysis between Emerging technologies and Adaptability

Coefficients <sup>a</sup>								
		Unstandardized Coefficients		Standardized Coefficients				
Model		B	Std. Error	Beta	t	Sig.	R	R <sup>2</sup>
1	(Constant)	15.826	2.075		7.626	.000	.963	.928
	Adaptability	.848	.024	.963	35.227	.000		

The value of coefficient of determination ( $R^2$ ) indicates how much of the variation in the independent variable (Emerging technologies) can explain the dependent variable (Adaptability). The value of  $R^2$  is .928 which means that 92% variation in the Adaptability of Industrial Technology Teachers is explained by the Emerging technologies used. The Cluster also provides detailed of model parameters (Beta values) and significance of this values. The unstandardized of Beta coefficient gives measures of the contribution of each variable to the model. It is clear from the cluster that the value of unstandardized Beta is .848 which represents the gradient of regression line. Therefore, if the value of predictor variable (Emerging technologies) is increased by one unit, there is .848 unit increase in the outcome variable (Adaptability). This impact is statistically significant because sig. value  $p < .000$  which is less than .05 (95% confidence interval). Therefore, the null hypothesis is rejected. It may be concluded that significant relationship exists between Emerging technologies and Adaptability of Industrial Technology Teachers.

### **Hypotheses 2**

There is no significant correlation on the influence of Emerging technologies on Curriculum Design of Industrial Technology Teachers

Data for testing hypothesis 2 are presented in cluster 5

### **Cluster 5: Model Summary of Regression Analysis between Emerging technologies and Curriculum Design**

		Coefficients					
		Unstandardized Coefficients	Std. Error	Standardized Coefficients			
Model		B	Error	Beta	T	Sig.	R
1	(Constant)	37.155	3.587		10.359	.000	.836
							.698



Curriculum Design	.593	.041	.827	14.439	.000		
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The coefficient of determination ( $R^2$ ) measures the extent to which changes in the independent variable (emerging technologies) can account for variations in the dependent variable (Curriculum Design). The adopted emerging technologies account for 92% of the variation in the Curriculum Design of industrial technology teachers, according to the  $R^2$  value of .698. The significance of the model parameters, or beta values, is also provided in detail by the cluster. The unstandardized beta coefficient provides an indication of how much each variable contributes to the model. The cluster makes it evident that the unstandardized beta value is .593; this value denotes the gradient of the regression line. Consequently, the outcome variable will grow by .698 units if the value of the predictor variable (emerging technologies) is increased by one unit. (Curriculum Design). The influence is statistically significant at  $p < .000$ , which is less than .05 (95% confidence range). Thus, the null hypothesis is rejected. It may be stated that there is a considerable association between emerging technologies and the Curriculum Design of industrial technology teachers.

### Hypotheses 3

There is no significant correlation on the influence of Emerging technologies on Curriculum Innovation of Industrial Technology Teachers

Data for testing hypothesis 3 are presented in cluster 6

### Cluster 6: Model Summary of Regression Analysis between Emerging technologies and Curriculum Innovation

Model	Coefficients <sup>a</sup>		Beta	T	Sig.	R	$R^2$
	Unstandardized Coefficients	Standardized Coefficients					
	B	Std. Error					

1	(Constant)	25.776	4.236		6.085	.000	.836	.698
	Curriculum Innovation	.727	.049	.836	14.898	.000		

The degree to which variation in the independent variable (emerging technologies) can account for variation in the dependent variable (Curriculum Innovation) is shown by the coefficient of determination ( $R^2$ ). The  $R^2$  value is .698; this indicates that the usage of emerging technologies accounts for 69% of the variation in the Curriculum Innovation of industrial technology teachers. Additionally, the Cluster offers a full explanation of the model parameters (Beta values) and their relevance. Each variable's contribution to the model is measured by the unstandardized beta coefficient. The cluster makes it evident that the unstandardized beta value, or the gradient of the regression line, is .727. Thus, in the event that the predictor variable's value (Emerging technologies) is raised by one unit, the outcome variable (Curriculum Innovation) increases by .727 units. Because of the sig. value  $p < .000$ , which is less than the .05 (95% confidence interval), this influence is statistically significant. Consequently, the null hypothesis is disproved. We can draw the conclusion that there is a strong correlation between industrial technology teachers' Curriculum Innovation and emerging technologies.

### **Findings of the study**

The following finding emerged from the study based on research questions answered and hypotheses tested.

1. There is a strong positive correlation between emerging technologies and the adaptability of industrial technology teachers in Northern Nigeria.
2. There is a strong positive correlation between emerging technologies and the curriculum design of industrial technology teachers in Northern Nigeria.
3. There is a strong positive correlation between emerging technologies and the curriculum innovation of industrial technology teachers in Northern Nigeria.

4. Emerging technology has a significant impact on the adaptability of industrial technology teachers in northern Nigeria.
5. Emerging technology has a significant impact on the curriculum design of industrial technology teachers in northern Nigeria.
6. Emerging technology has a significant impact on the curriculum innovation of industrial technology teachers in northern Nigeria.

### **Discussion of the findings**

The findings of the study revealed that a positive correlation exists between Emerging technology and adaptability of industrial technology teachers in northern Nigeria and this finding agreed with the findings of Adewusi, Al Hamad, Adeleke, Nwankwo & Nwokocha, (2023) The review paper explores the dynamic landscape of adaptive teaching strategies in early childhood education (ECE), focusing on a comparative analysis between Nigeria and the United Kingdom (UK). the paper underscores the importance of parental engagement, research, evaluation, and global collaboration in advancing the effectiveness of adaptive teaching strategies in Early Childhood Education. The findings also agreed with the findings of Olatunde-Aiyedun (2024) The study investigates the integration of artificial intelligence (AI) into science curricula at Nigerian universities, motivated by the imperative to prepare students for the evolving demands of the digital age. The findings of the study advocates for an adaptive curriculum that equips students with AI-related skills, contributing valuable insights for educational stakeholders on effective AI integration into science curricula. It was found that, correlation exists between emerging technologies and adaptive curriculum design and innovation of industrial technology teachers in Northern Nigeria. The findings also agreed with the findings of Ogwo, Ibegbulem, & Nwachukwu (2023) The paper expounds the application and perceived impact of Artificial Intelligence (AI) in academic libraries in Nigeria. Findings from the study revealed that the application of AI in academic libraries have the potentials to increases productivity, improved customer satisfaction through personalization, easy availability and accessibility of information, easy collaboration and knowledge sharing, virtual assistance and chatbots, and ultimately

increase overall operational effectiveness. This paper also explored some of the challenges associated with the application of AI technologies in academic libraries in Nigeria such as poor ICT skills and technical expertise, high initial costs of implementation, phobia for job displacement, epileptic power supply, poor maintenance culture, resistance to change, poor network connectivity, privacy and ethical implications, etc.

### **conclusion**

As technology continues to evolve, educators must embrace adaptability to effectively integrate these advancements into their teaching methodologies. The findings suggest that by leveraging tools such as artificial intelligence, adaptive learning platforms, and immersive technologies like virtual and augmented reality, industrial technology teachers can create more personalized and engaging learning experiences. This not only enhances student understanding but also prepares them for the demands of a rapidly changing workforce. Moreover, the study underscores the necessity for ongoing professional development for educators, ensuring they remain informed about technological trends and pedagogical strategies. This commitment to continuous improvement is essential for fostering an innovative educational environment that meets the diverse needs of students.

### **Recommendations**

Based on the findings made and the conclusion drawn, the following recommendations were made:

1. The findings of the study should be integrated into Curriculum Design for Industrial Technology Education.
2. The emerging technologies, adaptability, curriculum design and curriculum innovation influence levels identified of industrial technology teachers should be used to enhance professional development for Educators
3. The government should include concept of emerging technologies, adaptability, curriculum design and curriculum innovation to Promote a Collaborative Learning

Environments that leverage technology to facilitate teamwork and problem-solving among students.

## Reference

- Abubakar, H. (2018). Impact of internet technology usage on job performance of senior secondary school teachers in kaduna state Nigeria. *International Journal of Curriculum and Instruction*, 10(2), 152-167.
- Adegbite, O. O., & Muibi, T. G. (2021). Integrating innovative learning assessment approaches in Nigeria's tertiary education system.
- Adewusi, O. E., Al Hamad, N. M., Adeleke, I. J., Nwankwo, U. C., & Nwokocha, G. C. (2023). Adaptive teaching strategies in early childhood education: a review for Nigeria and the UK. *International Journal of Applied Research in Social Sciences*, 5(8), 255-271.
- Agbo, A. A. (2010). Cronbach's alpha: Review of limitations and associated recommendations. *Journal of Psychology in Africa*, 20(2), 233-239.
- Agri, E., Kennedy, N., Bonmwa, G., & Acha, O. (2018). Technology innovation and sustainable entrepreneurship development in Nigeria: stakeholders' impact assessment in central Nigeria. *Journal of Economics, Management and Trade*, 21(3), 1-16.
- Aluko, O., & Adeyemi, O. (2023). Education governance and sustainable development in Nigeria: A review of Edo-BEST policy. *Journal of Research Administration*, 5(2), 9737-9751.
- Ayamga, M., Lawani, A., Akaba, S., & Birindwa, A. (2023). Developing institutions and inter-organizational synergies through digitalization and youth engagement in african agriculture: The case of "Africa Goes Digital". *Land*, 12(1), 199.
- Babatunde, A. E., Chukuwuemeka, E. J., Abdulrahim, M., & Adai, S. I. (2019). Academic Achievement of Direct-Entry and Non-Direct Entry (Pre-NCE) Science Students in Niger State College of Education, Minna Nigeria: Implications for Educational Administrators. *International Journal of Innovative Research & Development*, 8(6), 103-109.
- Ebekozien, A., Aigbavboa, C., & Aliu, J. (2023). Built environment academics for 21st-century world of teaching: stakeholders' perspective. *International Journal of Building Pathology and Adaptation*, 41(6), 119-138.

- Egielewa, P., Idogho, P. O., Iyalomhe, F. O., & Cirella, G. T. (2022). COVID-19 and digitized education: Analysis of online learning in Nigerian higher education. *E-learning and Digital Media*, 19(1), 19-35.
- Enang, C. E. (2022). Emerging technologies in teaching and learning of business education programmes in the new normal in tertiary institution in Nigeria. *Nigerian Journal of Business Education (NIGJBED)*, 9(2), 64-71.
- Enang, C. E., & Okute, A. L. (2019). Leveraging on new technologies for skill acquisition of business education in tertiary institutions in Nigeria for the e-world. *Nigerian Journal of Business Education (NIGJBED)*, 6(1), 331-337.
- Essien, N. P., & Ntui, H. N. (2024). Adoption of Robotics in Educational System: Trends and Implications for Nigerian Schools. *Asia-Africa Journal of Recent Scientific Research*, 4(1).
- Goodluck, E. E. (2021). *A SURVEY OF THE KNOWLEDGE AND APPLICATION OF DIGITAL CONSTRUCTION TECHNOLOGY SUCH AS BUILDING INFORMATION MODELLING AND DIGITAL TWIN TECHNOLOGY IN LAGOS, NIGERIA* (Doctoral dissertation, the Robert Gordon University).
- Kabir, M. N., & Kabir, M. N. (2019). Technologies of the future. *Knowledge-Based Social Entrepreneurship: Understanding Knowledge Economy, Innovation, and the Future of Social Entrepreneurship*, 91-133.
- Kola, A. J., & Opeyemi, A. A. (2021). THE NIGERIAN CERTIFICATE IN EDUCATION (NCE): SCIENCE GRADUATES'EMPLOYABILITY. *Innovare Journal of Education*, 9(1), 1-6.
- Lanre-Babalola, F. O., Oginni, B. O., Ajibola, K. S., Olowu, A. E., Balogun, R. A., Tewogbade, S. O., ... & Gbotosho, A. S. (2023). Human capital development and employee performance: Evidence from Osun State Ministry of Human Resource and Capacity Building, Nigeria. *Journal of Behavioural Studies*, 4(2).
- Lee, A., & Jung, E. (2021). The mediating role of entrepreneurial mindset between intolerance of uncertainty and career adaptability. *Sustainability*, 13(13), 7099.
- Mohammed, M. K., & Abdulhamid, M. (2021). E-LEARNING AS A TOOL FOR SOCIAL AND COLLABORATIVE TEACHING AND LEARNING IN A PANDEMIC ERA: AN OVER VIEW.

- Ogungboye, O. A. (2023). *Influence of Office Technology and Management Curriculum on Career Readiness of Graduating Students in Polytechnics* (Master's thesis, Kwara State University (Nigeria)).
- Ogwo, U., Ibegbulem, F., & Nwachukwu, V. N. (2023). Applications and perceived impact of artificial intelligence in academic libraries in Nigeria. *Library Philosophy & Practice*.
- Okolie, U. C., Igwe, P. A., Mong, I. K., Nwosu, H. E., Kanu, C., & Ojemuyide, C. C. (2022). Enhancing students' critical thinking skills through engagement with innovative pedagogical practices in Global South. *Higher Education Research & Development*, 41(4), 1184-1198.
- Okolie, U. C., Igwe, P. A., Nwosu, H. E., Eneje, B. C., & Mlanga, S. (2020). Enhancing graduate employability: Why do higher education institutions have problems with teaching generic skills? *Policy Futures in Education*, 18(2), 294-313.
- Okwori, R. O., Kareem, W. B., & Abutu, F. (2019). Digital Technologies and Woodwork Skills Development: The Nigeria Experience.
- Olatunde-Aiyedun, T. G. (2024). Artificial Intelligence (AI) in Education: Integration of AI Into Science Education Curriculum in Nigerian Universities. *International Journal of Artificial Intelligence for Digital*, 1(1).
- Omekwu, C. O., Ugwu, F. N., & Ejikeme, A. N. (2023). Access to information for sustainable development in the digital age: Librarians' perspectives in two Nigerian universities. *Information Development*, 39(3), 624-637.
- Onojah, A. A., Onojah, A. O., & Ala, N. A. (2022). STUDENTS ADAPTIVE LEVEL TO THE NEW LEARNING STYLES AS A RESULTANT EFFECT OF COVID-19. *Indonesian Journal of Learning and Instruction*, 5(2).
- 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(11), 35-39.
- Oviawe, J. I., & Uwameiye, R. (2020). Approaches for developing generic skills in building technology graduates for global competitiveness. *Journal of vocational education studies*, 3(1), 25-38.