EXAMINING THE CHALLENGES AND OPPORTUNITIES OF AI-DRIVEN CURRICULA REVOLUTION ON AUTOMOBILE TECHNOLOGY IN TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET) INSTITUTIONS IN SOUTH-SOUTH, NIGERIA.

[1]Eteli Harold Imbasi; [2]Ifeanyi Benedict Ohanu; [3]Emmanuel O. Ede & [4]Patrick B. Asu-Nandi

[1]Department of Vocational and Technical Education, Institute of Entrepreneurship and Vocational Training, Elebele, Bayelsa State.
eteli.imbasi.pg97167@unn.edu.ng; 08065876071
[2&3]Department of Industrial Technical Education, Faculty of Vocational and Technical Education, University of Nigeria, Nsukka.
[4]Department of Technology Education, University of Education and Entrepreneurship, Akamkpa, Cross River State.

Abstract

This study investigated the challenges and opportunities of AI-driven curricula revolution on Automobile Technology in Technical and Vocational Education and Training (TVET) institutions in south-South, region of Nigeria, with the aim of preventing educational obsolescence in the sector. The study adopted a descriptive survey design. The entire population of 113 respondents, comprising 16 teachers, 10 instructors, and 87 students, was studied without sampling due to its manageable size. A structured 16-item questionnaire validated by experts and tested for reliability (Cronbach Alpha = 0.88) served as the instrument for data collection. Data analysis was conducted using mean, standard deviation, and Analysis of Variance (ANOVA) using SPSS. Findings revealed that lack of infrastructure, inadequate funding, and low instructor competence were the most significant challenges in integrating AI-driven curricula. Respondents acknowledged several opportunities such as hands-on experience with autonomous vehicles, enhanced problem-solving abilities, and predictive maintenance skills, though employability gains and cybersecurity knowledge were less emphasized. Stakeholders agreed on the importance of periodic AI training, certification incentives, and institutional collaborations, while expressing less interest in centralized knowledge-sharing platforms. The study concludes that while AI integration holds immense potential for transforming automobile education, its success hinges on systemic improvements in infrastructure, professional development, and policy direction. It recommends targeted investments, policy reforms, and strategic partnerships to facilitate effective AI adoption in TVET institutions across South-South geo-political region of Nigeria.

κeywords: Artificial Intelligence (AI), AI-driven Curricula, TVET, Automobile Technology, Curricula Revolution

Introduction

The rapid evolution of Artificial Intelligence (AI) technology in the 21st century has significantly transformed the landscape of the automotive industry to prevent educational obsolescence and to prepare a formidable skilled workforce. This study focuses on three specific AI-driven curriculum areas: Technological Infrastructure, Government funding and

AI-driven curriculum implementation. By x-raying these challenges and opportunities of AI-driven curricula revolution on automobile technology within TVET institutions in South-South region of Nigeria, the research promises to expose the potential opportunities, and the significant role AI-technology plays in improving the skillsets of TVET students. George & Wooden (2023) stated that AI has the potential to revolutionize traditional pedagogical approaches and the incorporation of AI-driven curriculum into education presents several opportunities for educators, students, and institutions alike that has changed the narrative in teaching-learning and efficient engagement of students. Omeh et al. (2025) asserted that AI applications, such as ChatGPT, are gradually used in classrooms and they have the potential to modify the conventional teaching and learning methodologies, particularly in areas of personalized learning, intelligent tutoring systems, and automated assessment. Uzo (2021) identified the need for teachers and students to develop new competences as a challenge in integrating AI-driven curriculum into automobile technology. Not all educators may be conversant with AI tools or competent enough to integrate them into the curriculum as required, hence, students need to learn to use this AI technology with dexterity.

Artificial Intelligence is leveraging computers and machines to mimic the problem-solving and decision-making capabilities of the human mind. Operationally, AI is a computerized machine system designed to perform tasks that require human cognitive intelligence ranging from learning, problem-solving, decision-making and developing innovative curricular content. Curriculum is the sum total of the school's planned program of studies designed to bring about desirable changes in the behavior of students both in and outside its premises (Offorma, 2022). AI-enhanced curriculum is an educational system where AI carries out routine teaching and administrative tasks, including grading, scheduling, and content development. Automation of these tasks reduces the workload for teachers to allow them to focus their energy on more complicated tasks like mentoring students, critical thinking development, and creating engaging, interactive learning environments. (Chen, Chen & Lin 2020). Operationally, a curriculum is the collation of learning experiences and educational objectives offered by a school or educational program that encompasses both content, practical, skills and everything that is taught in the school system as it relates to technical and vocational education and training TVET.

Technical and Vocational Education and Training (TVET) is an educational program that emphasizes practical or manipulative instruction that develops basic knowledge and hands-on skills required to fit into a variety of jobs, trades, occupations and industries (Mfam et al, 2025) UNESCO, (2022). TVET refers to "aspects of the educational process involving, in

addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic life. Operationally, Technical and vocational education and training TVET is that aspect of education that is skills and practical oriented in addition to technologies and other related studies that serve as shock absorber to poverty and unemployment stress in society. Technical and vocational education covers a wide range of trade areas including Metalwork technology, Building technology Electrical Electronic technology and Automobile technology,

Automobile technology education is the application of scientific knowledge to design, selection of materials, construction, operation, maintenance, and repair of automobiles (Poripo, et al, 2020). They also emphasized the acquisition of pedagogical skills for teaching the subject. This definition highlights the practical and vocational nature of the field, with a strong focus on preparing students to become skilled technicians who can test, diagnose, and repair faults in vehicles. Automobile technology is the study of how self-propelled vehicles move and refers to the creation or design of vehicle technology and the remediation or repairs required. This can involve the engine and other systems, engineering, mechanics and computer technology. The Application of technology for vehicle maintenance and repair automobile technology, particularly in the context of vocational education (Ujevbe, et al. 2020). Operationally, Automobile technology is the application of knowledge, skills and competences to construct, maintain and repair motor vehicles by automobile mechanics, technicians and auto-electricians which prepares them with the expertise to work on complex systems of modern cars, trucks, and other vehicles, thereby revolutionizing and contributing meaningfully to the development of society.

Curriculum revolution is defined as the radical adoption of digital tools that transform university business models and instruction processes. It is not merely a "technological upgrade" but a journey that replaces traditional instruction with virtual learning environments (VLEs) and open educational resources (OERs) to bridge the digital divide (Adeleye et al., 2024). Anikweze and Ugodulunwa (2020) defined curriculum revolution as a radical shift in design that moves away from traditional academic standard-setting to one that embeds employability competencies such as digital proficiency and entrepreneurial mindset directly into the core curriculum to bridge the gap between graduation and the 21st-century workforce. For Mabaso (2026), curriculum revolution is the prioritization of reskilling, upskilling, and cross-skilling" initiatives within educational models to enhance workforce agility. It is a departure from "static skill acquisition" toward a "lifelong learning" model necessitated by the rapid integration of

robotics and IoT. Operationally Curricula revolution refers to the fundamental rearrangement of educational frameworks to align with emerging technologies and the global labour market demands.

Fragile technological infrastructure, inadequate government expenditure on education, resistance to implementing AI education because of fear of being replaced by AI, achievement gaps in education based on social and economic groups, and unprepared teachers for AI implementation were some of the main challenges of AI-driven curriculum (Hashakimana & Habyarimana 2022). One major obstacle within TVET institutions comes from inadequate infrastructure combined with insufficient technical resources. AI-powered learning systems need highspeed internet connections together with advanced computing hardware and complex AI software that most underfunded schools and training facilities simply cannot afford (Alotaibi, 2023). The lack of adequate training for teachers leads to limited capitalization of AI potential while inflicting negative consequences on the effective utilization of AI resources along with weakened potential for individualized instruction (Familoni, 2024). The implementation of AI technology meets substantial resistance as a major obstacle for its integration into TVET. Traditional educational approaches have strong roots in vocational and technical education yet numerous educational institutions along with their staff demonstrate unwillingness to adopt AI-based teaching methods (Harry. 2023). Integrating AI with teaching establishments makes many educators worry that AI will take over their traditional roles while some educators struggle to adapt quickly to emerging technological advances. The integration of artificial intelligence (AI) into Technical and Vocational Education and Training (TVET) offers significant opportunities to modernize learning, personalizing instruction, and prepare students for the demands of Automotive Industry.

However, the adoption of AI in TVET is not without its challenges. Based on a review of current literature and academic research, some key challenges were identified: Inadequate infrastructure and high implementation costs, Lack of teacher preparedness and training, Data privacy, algorithmic bias, and Ethical concerns difficulty in aligning AI with practical, hands-on skills, Curriculum development and assessment gaps. The financial investment required for hardware, software, and maintenance can be substantial, creating a significant hurdle for institutions with limited budgets. This inequality in resources can also worsen the digital divide, creating an uneven playing field for students and institutions that cannot afford to integrate these technologies (Jiang et al., 2024). The successful integration of AI in TVET depends heavily on the skills and readiness of educators. Many TVET teachers are not adequately prepared to use AI tools, develop AI-enhanced curricula, or manage AI-powered learning

environments (ResearchGate, 2025). The transition from traditional, hands-on teaching methods to AI-augmented instruction requires a new set of competencies. Without proper training and professional development, teachers may feel intimidated, resistant to change, or ill-equipped to effectively leverage AI's potential (Vallejo Guevara, 2019; Amdan et al., 2025). This challenge extends beyond just using technology; it also involves understanding the pedagogical shifts required to facilitate learning in a technology-driven curriculum.

Theoretical Framework

Disruptive Innovation Theory: This theory, propounded by Clayton Christensen, suggests that a new technology or business model can disrupt an existing market by initially appealing to a functional audience with more affordable and convenient product. In this context, AI-driven curricula act as the disruptive innovation.

Statement of the problem

Provision of Adequate technological infrastructure, sufficient funding and effective implementation for the AI-driven curricula should revolutionize the automotive industry and equip both teachers, instructors and students with the necessary skills. Adequate technological infrastructure should enhance the skillset of the students and improve teachers and instructors' knowledge and understand the emerging technologies in the automobile industry. Adequate funding by government will also motivate and enhance service delivery. Meanwhile, the effective implementation of the curriculum will enhance attainment of the set objectives of the AI-driven curriculum. Collectively, these tools should foster innovation, enhance employability, and drive economic growth and revolutionize the automobile industry.

Unfortunately, the inadequate technological infrastructure, insufficient funding and ineffective implementation of the AI-driven curriculum has negatively impacted on both the teachers, instructors and especially the students. Consequently, their psycho-motive potentials diminish, limiting their innovation, employability, and ultimately hindering economic growth in their societies. This compelling research gap prompted to ascertain the extent to which these challenges and opportunities of AI-driven curricula can transform the automobile technology students in technical and vocational education and training (TVET) institutions and industries to prevent educational obsolescence in South-South Nigeria.

Purpose of the Study

The general purpose of the study was to examine the challenges and opportunities of AI-driven curricula revolution on automobile technology in technical and vocational education

and training (TVET) institutions in south-south, Nigeria. Specifically, the study sought to ascertain the:

1. Technological Infrastructure that can revolutionize the automobile industry and students in technical and vocational education and training (TVET) institutions when AI-driven curricula is integrated in South-Soth Nigeria.
2. Government Funding that can revolutionize the automobile industry and students in technical and vocational education and training (TVET) institutions when AI-driven curricula is integrated in South-Soth Nigeria.
3. AI-Driven curriculum implementation by TVET teachers that can revolutionize the automobile industry and students in technical and vocational education and training (TVET) institutions in South-Soth Nigeria.

Research Question

Three research questions were formulated to guide the study.

1. How can Technological Infrastructures revolutionize the automobile industry and students in technical and vocational education and training (TVET) institutions when AI-driven curricula are integrated in South-Soth Nigeria?
2. How can Government Funding revolutionize the automobile industry and students in technical and vocational education and training (TVET) institutions when AI-driven curricula are integrated in South-Soth Nigeria?
3. How can AI-driven curriculum implementation revolutionize the automobile industry and students in technical and vocational education and training (TVET) institutions in South-Soth Nigeria?

Hypothesis

The following null hypotheses are postulated to guide the study:

1. There is no significant difference in the mean responses of students and instructors on Technological Infrastructure to revolutionize the automobile industry and students in technical and vocational education and training (TVET) institutions when AI-driven curricula are integrated in South-Soth Nigeria
2. There is no significant difference in the mean responses of teachers, students and instructors on Government Funding to revolutionize the automobile industry and students in technical and vocational education and training (TVET) institutions when AI-driven curricula are integrated in South-Soth Nigeria

3. There is no significant difference in the mean responses of teachers, students and instructors on AI-driven curriculum implementation by TVET teachers to revolutionize the automobile industry and students in technical and vocational education and training (TVET) institutions in South-Soth Nigeria.

Methodology

This research adopted a descriptive survey research design. The study was carried out in Rivers and Bayelsa States, South-South Nigeria. The population was 113 respondents, comprising of 16 Automobile Technology teachers, 10 Automobile Technology workshop assistants and 87 Automobile Technology students. No sample was drawn as the population was manageable. A 16-items structured questionnaire was postulated to collect data for this research. The instrument contains two sections; section A to elicit information on the biodata of the respondents while section two was further divided into three clusters of A. B and C. Cluster A collected information on major challenges faced by Automobile Technology teachers and students in TVET institutions, when integrating AI-driven curricula. Cluster B to elicit data on the opportunities that an AI-driven revolution presents for Automobile Technology students while cluster C collected information on the perceived opportunities and benefits of an AI-driven curriculum from the perspective of teachers, students, and industry stakeholders in TVET institutions. 4-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1) were used. The instrument was face validated by experts from the Department of Industrial and Technical Education, University of Nigeria Nsukka. Cronbach Alpha reliability coefficient was used to determine the reliability of the instrument which yielded a reliability coefficient of 0.88. This indicated that the instrument was reliable. Two research assistants were engaged to assist the researcher in administering and collecting the questionnaire items. Data collected from the respondents was analyzed using Statistical Package for Social Sciences (SPSS). Means were used to analyze the items and 2.50 was set as the benchmark. ANOVA statistical Analysis was used to test null hypotheses at 0.05 probability level of significance. Decision was taken as follows: if the calculated significant value is greater or equal to the 0.05, the null hypothesis will be accepted. On the other hand, if the calculated value is less than 0.05, the null hypothesis will not be rejected.

Results

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

Table 1: Technological infrastructure revolutionizes the automobile industry and students in technical and vocational education and training (TVET) institutions when AI-driven curricula is integrated in South-Soth Nigeria.

s/n	Item statement	$\bar{X}$	Std. Dev.	Remark
1	Lack of adequate infrastructure (e.g., computers, internet access, specialized software)	3.79	0.41	SA
2	Lack of institutional funding	3.67	0.47	SA
3	Inadequate technical skills among instructors	3.60	0.51	SA
4	Limited access to necessary AI-enabled equipment	2.55	0.70	A
5	Absence of a clear government policy or roadmap for AI in TVET	1.14	0.35	SD
6	Curriculum materials are outdated and do not include AI concepts	1.89	0.62	D
Grand Mean		**2.77**	**0.51**	**A**

Key: *$\bar{X}$ = Mean; SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree.*

The data in Table 1, suggests that respondents generally agree (Grand Mean = 2.77) that the listed items are the notable challenges faced by automobile technology students and instructors. Item 1 – 3 have their mean ranging from 3.60 – 3.79 indicating that the respondents strongly agree that lack of adequate infrastructure ($\bar{X}$ = 3.79), lack of institutional fundings ($\bar{X}$ = 3.67) and inadequate technical skills among instructors ($\bar{X}$ = 3.60) are three major challenges faced by automobile technology students and instructors. The respondents also agree that limited access to necessary AI-enabled equipment while disagreeing that item 5 and 6 are not major challenges faced by automobile technology students and instructors.

Table 2: ANOVA analysis on the mean Responses of Teachers, Students and Instructors on the Major Challenges Faced by Automobile Technology Students and Instructors in TVET Institutions in South-South Nigeria when Integrating AI-driven Curricula

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.01	2	0.00	0.04	0.96
Within Groups	11.83	180	0.07		
Total	11.834	182			

The results in Table 2 showed no statistically significant difference between the groups, F (2180) = 0.04, p = 0.96**.** Since the p-value (.96) is much greater than the 0.05 significance level, therefore, the null hypothesis was not rejected. This suggests that the perceptions of Lecturers, instructors, and Students are statistically the same regarding the challenges faced by Automobile Technology students and instructors in TVET institutions in South-South Nigeria when integrating AI-driven curricula

Table 3: Mean Responses of Respondents on the Opportunities that an AI-driven Curricula Revolution Presents for Automobile Technology Students in South-South Nigeria.

S/n	Item statement	$\bar{X}$	Std. Dev.	Remark
1	The ability to work with autonomous vehicles.	3.77	0.43	SA
2	Enhanced problem-solving and critical thinking	3.37	0.51	A
3	Improved skills in predictive maintenance.	3.46	0.51	A
4	Increased employability and career advancement.	2.40	0.77	D
5	Better understanding of vehicle cybersecurity.	1.41	0.49	SD
Grand Mean		**2.88**	**0.58**	**A**

Key: *$\bar{X}$ = Mean; SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree.*

The Grand Mean of 2.88 in Table 3 indicates that, overall, respondents agree that the opportunities that an AI-driven curricula revolution presents for Automobile Technology students in South-South Nigeria. Respondents strongly agreed that ability to work with autonomous vehicles ($\bar{X}$ = 3.77). The respondents also agreed that AI enhanced problem-solving and critical thinking ($\bar{X}$ = 3.37). and improved skills in predictive maintenance ($\bar{X}$ = 3.46). the opportunities that an AI-driven curricula revolution presents for Automobile Technology students in South-South Nigeria. The respondents disagreed that increased employability and career advancement. ($\bar{X}$ = 2.40) and that AI makes for better understanding of vehicle cybersecurity ($\bar{X}$ = 1.41).

Table 4: ANOVA Analysis on the Mean Responses of TVET Teachers, Instructor and Student in the Opportunities that an AI-driven Curricula Revolution Presents for Automobile Technology Students in South-South Nigeria.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	0.15	2	0.07	0.88	0.42
Within Groups	14.80	180	0.08		
Total	14.94	182			

Table 4 shows ANOVA analyses which revealed no statistically significant difference in mean ratings across the three groups, F (2,180) = 0.88, p = 0.42. Since the p-value (.42) is greater than the 0.05 level of significance, therefore, the null hypothesis was not rejected. This indicates that the three groups share similar perceptions regarding the opportunities that an AI-

driven curricula revolution presents for Automobile Technology students in South-South Nigeria

Table 5: Mean Responses of Respondents on the Perceived Opportunities and Benefits of an AI-driven Curriculum from the Perspective of Students, Instructors, and Industry Stakeholders in South-South Nigeria

s/n	Item statement	$\bar{X}$	Std. Dev.	Remark
1	Mandatory, periodic professional development and training on AI.	3.07	0.43	SA
2	Incentives for instructors who earn certifications in AI-related fields.	3.14	0.51	A
3	Collaboration with universities or tech firms for "train-the-trainer" programs.	3.41	0.51	A
4	Recruitment of new instructors with proven AI expertise.	2.98	0.52	A
5	Development of an institutional knowledge-sharing platform for AI best practices.	1.42	0.49	SD
	Grand Mean	**2.80**	**0.58**	**A**

Key: $\bar{X}$ = Mean; SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree.

The Grand Mean of 2.80 in Table 5 indicates that, overall, respondents agree that the listed items are the perceived opportunities and benefits of an AI-driven curriculum from the perspective of students, instructors, and industry stakeholders in South-South Nigeria. Respondents strongly agreed that mandatory, periodic professional development and training on AI. ($\bar{X}$ = 3.07). Incentives for instructors who earn certifications in AI-related fields ($\bar{X}$ = 3.14). Collaboration with universities or tech firms for "train-the-trainer" programs ($\bar{X}$ = 3.41) and Recruitment of new instructors with proven AI expertise (2.98). The respondents disagreed that Development of an institutional knowledge-sharing platform for AI best practices ($\bar{X}$ = 1.42).

Table 6: ANOVA Analysis on the Mean responses of TVET Teachers, Instructors and Students in the on the Perceived Opportunities and Benefits of an AI-driven Curriculum from the Perspective of Students, Instructors, and Industry Stakeholders in South-South Nigeria

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	0.15	2	0.07	0.88	0.42
Within Groups	14.80	180	0.08		
Total	14.94	182			

Table 6 shows ANOVA analyses which revealed no statistically significant difference in mean ratings across the three groups, F (2, 180) = 0.88, p = 0.42. Since the p-value (.42) is greater than the 0.05 level of significance, therefore, the null hypothesis was not rejected. There is no significant difference in the mean rating of the responses of lecturers, students and instructors on the perceived opportunities and benefits of an AI-driven curriculum from the perspective of students, instructors, and industry stakeholders in South-South Nigeria

Discussion of Findings

What are the major challenges faced by Automobile technology education students and instructors in TVET institutions when integrating AI-driven curricula in South-South Nigeria?

Respondents strongly agreed that lack of adequate infrastructure, insufficient funding, and inadequate instructor technical skills are major challenges. They also agreed limited access to AI-enabled equipment is problematic, while disagreeing that outdated curriculum materials or absence of governmental AI policy are significant issues.

The findings of the study align closely with prior findings in Nigeria and similar contexts: Uduafemhe (2021) identified both funding shortages and lack of infrastructure as major barriers in Abia State TVET institutions. Adigun and Okebukola (2023) also highlighted the severe impact of outdated hardware, poor connectivity, and frequent power outages on AI deployment in Nigerian higher education institutions, illustrating how infrastructure limitations hinder adoption of emerging technologies. Kolade et al. (2024) further emphasized that inadequate funding consistently undermines the ability of Nigerian TVET institutions to invest in modern facilities and equipment, impeding program relevance and quality. Additionally, Ogunode & Agwor (2021) reported a significant skills gap among educators regarding digital literacy and AI competence in Nigerian educational systems, particularly in basic and vocational settings. These studies reinforce the findings of this study that infrastructure, funding, and human resource capacity are primary barriers. The ANOVA result ($F = 0.04$, $p = 0.96$) confirms that students, instructors, and lecturers share these perceptions equally.

Opportunities presented by AI-driven curricula for Automobile Technology students

Respondents strongly agreed that working with autonomous vehicles is a prime opportunity. They also agreed that AI enhances critical thinking**,** problem-solving, and predictive maintenance skills, though they disagreed that AI significantly improves employability or vehicle cybersecurity knowledge**.**

The findings of this study are supported by the finding of IJERT study at an Ethiopian TVET institute found that over 90% of trainers and trainees rated AI-driven virtual simulations as enhancing curriculum relevance and hands-on skills, supporting your results on problem-solving and maintenance capability (IJERT, 2024). MDPI review (2024) on AI-driven curricular design noted that AI-rich environments foster adaptive learning, personalization, and critical-thinking development, particularly through real-time feedback mechanisms (Karataş, 2024). Yet, Reuters (2024) cautioned that while the auto industry is rapidly evolving toward EVs and automation, those entering the workforce without AI-specific training still face reduced employability, reflecting respondents' doubts about career advancement (Reuters, 2024). The consistency across stakeholder perceptions (ANOVA $p = .42$) further confirms consensus on these opportunities and limitations.

Perceived opportunities and benefits from students, instructors, and industry stakeholders

The study found that there is a consensus view that mandatory periodic AI training**,** instructor certification incentives**,** "train-the-trainer" collaborations**,** and hiring AI-proficient instructors are beneficial. The idea of an institutional knowledge-sharing platform was not widely supported.

The findings of this study are supported by a systematic review of AI integration in engineering education (MDPI, 2024) which highlighted the critical importance of continuous professional development and capacity building for effective AI curriculum support (Karataş, 2024). Secondly, Akgün & Hosseini (2025) revealed that both academic and industry experts emphasize the need for stronger alignment between AI curricula and real-world industry requirements, underscoring the value of public–private and train-the-trainer partnerships (Akgün & Hosseini, 2025). Conversely, literature on centralized knowledge-sharing platforms points to challenges, such as data governance concerns, low institutional capacity, and limited digital literacy, that undermine their adoption in resource-constrained settings (MDPI, 2024). Again, the ANOVA result ($F = 0.88$, $p = .42$) shows alignment in stakeholder perceptions across this question.

Conclusion

This study examined the challenges and opportunities of AI-driven curricula revolution on Automobile Technology students in TVET institutions in South-South Nigeria, with a focus on preventing educational obsolescence. Findings revealed that lack of infrastructure,

insufficient funding, and low instructor technical competence are key challenges inhibiting AI integration. Despite these obstacles, respondents recognized several opportunities offered by AI-driven curricula, such as hands-on experience with autonomous vehicles, enhanced problem-solving skills, and predictive maintenance proficiency. However, concerns over employability impact and cybersecurity awareness suggest these areas are underdeveloped within current curricula.

Furthermore, stakeholders such as students, instructors, and industry representatives, shared common perspectives on the need for periodic professional development, incentivized certifications, and institutional partnerships to support AI curriculum implementation. The absence of significant differences in perception across groups (as shown by ANOVA results) indicates a shared understanding and urgency regarding the transformative potential of AI in automobile education. The findings emphasize that while the AI-driven curriculum revolution offers immense potential, realizing these benefits requires systemic intervention, resource investment, and capacity development to equip TVET institutions and personnel for the digital age.

Recommendations

Based on the study's findings and conclusions, the following recommendations are made:

1. Government and Educational Policymakers should prioritize increased funding to support infrastructure development, procurement of AI-enabled equipment, and digital transformation within TVET institutions in South-South Nigeria.
2. TVET Institutions and Curriculum Developers should revise and modernize existing automobile technology curricula to incorporate relevant AI concepts, including vehicle automation, predictive maintenance, and cybersecurity awareness. They must establish mandatory and periodic training programs for instructors to enhance their competence in AI tools, pedagogy, and applications.
3. Lecturers and Instructors should pursue certifications in AI-related fields, supported by institutional incentives, to improve their instructional effectiveness and align with emerging technological trends. They should also foster collaborative learning environments through real-time simulations and adaptive learning platforms that promote critical thinking and technical proficiency.
4. Industry Stakeholders and Employers should partner with TVET institutions through "train-the-trainer" models, providing access to real-world AI applications and mentoring for both staff and students.

References

Adeleye, O., et al. (2024). Digital learning in the 21st century: Trends, challenges, and innovations in technology integration. Frontiers in Education, 10. https://doi.org/10.3389/feduc.2025.1562391

Adigun, O., & Okebukola, P. (2023). *Leveraging artificial intelligence for enhanced assessment and feedback mechanisms in Nigerian higher education*. International Journal of Research and Innovation in Social Science.

Akgün, M., & Hosseini, H. (2025). *AI education in a mirror: Challenges faced by academic and industry experts*. Preprint.

Alotaibi, N. S., & Alshehri, A. (2023). *Prospers and obstacles in using artificial intelligence in Saudi Arabia higher education institutions: The potential of AI-based learning outcomes.* Sustainability. *https://doi.org/10.3390/su151310723*

Amdan, M. A., Janius, N., Saidin, M. S., & Kasdiah, M. A. H. (2025*). Impact of artificial intelligence in TVET and STEM education among higher learning students in Malaysia. Journal of Research in Mathematics, Science, and Technology Education, 2(1), 1–14.*

Anikweze, C. U., & Ugodulunwa, C. A. (2020). Relevance of the Nigerian Core Curriculum and Minimum Academic Standards (CCMAS) in equipping students for employability. FUNAAB Journal of Humanities, Social Sciences and Creative Arts, 15(1).

Chen, L., Chen, P., & Lin, Z. (2020). *"Artificial Intelligence in Education: A Comprehensive Survey of Its Past, Present, and Future." Journal of Educational Technology Development and Exchange, 13(1), 1-19.*

Christensen, Clayton M., Michael Raynor & Rory McDonald. *(2015). "What Is Disruptive Innovation?" Harvard Business Review 93, no. 12: 44–53.*

EJERT [IJERT]. (2024). *Relevance and importance of artificial intelligence in teaching vocational education and training: Case study at Ethiopia Federal TVET Institute*. *International Journal of Engineering Research & Technology*.

Familoni, B. T., & Onyebuchi, N. C. (2024). *Advancements and challenges in AI integration for technical literacy: A systematic review.* Educational Science and Technology Journal. *https://doi.org/10.51594/estj.v5i4.1042 4*

George, B & Wooden, O., 2023. *Managing the strategic transformation of higher education through artificial intelligence.* Administrative Sciences, 13(9), p.196.

Harry, A., & Sayudin, S. (2023). *Role of AI in education.* Injurity: International Journal of Injury and Risk Prevention, 2*(3), 52. https://doi.org/10.58631/injurity.v2i3.52)*

Hashakimana, T.; Habyarimana, J. de D, (2022). *The prospects, Challenges and Ethical Aspects of Artificial Intelligence in education*. Journal of Education. *http://stratfordjournalpublishers.org/journal-of-ed*

Jiang, J. et al. (2024). *Opportunities and Challenges of AI in Vocational Education*. Retrieved from ResearchGate.

Karataş, F. (2024). *Reshaping curriculum adaptation in the age of artificial intelligence: Mapping teachers' AI-driven adaptation patterns.* British Educational Research Journal.

Kolade, A. A., Ilori, T. J., & Oke, B. B. (2024). *Funding: A bane to mainstreaming TVET in Nigeria.* International Journal of Research and Innovation in Social Science, ??(May), 2988–2996

Mabaso, B. A. (2026). Advancing economic growth through human capital development in the era of the Fourth Industrial Revolution. SA Journal of Human Resource Management.

Mfam, K. I, Okanazu, O. O., & Ogbuabor, P. N. (2025). *Influence of AI-powered adaptive learning systems on business and entrepreneurial competencies' development amongst students in TVET in university of Nigeria, Nsukka.* Paper Presented at the 3rd Hybrid International Conference of Department of Industrial Technical Education, Faculty of

Vocational and Technical Education, University of Nigeria, Nsukka held from 28th May 30th May, 2025

MDPI. (2025). "*Research Perspectives on Innovation in the Automotive Sector*." Sustainability, 17(7), 2795. Retrieved from https://www.mdpi.com/2071-1050/17/7/2795

Offorma, G. C (2002), C*urriculum Theory and Planning. Enugu:* Family Circle Publications. 978-2568-82-1

Ogunode, U., & Agwor, U. (2021*). Exploring the challenges of artificial intelligence in basic education in Nigeria [PDF]*. ResearchGate. Okoro, O.M. (2006) Principles and Methods in Vocational and Technical Education. Nsukka: University Trust Publishers. Okoro, O.M. (2006) Principles and Methods in Vocational and Technical Education. Nsukka: University Trust Publishers.

Ómarsson, I. (2020, January 3). *"14 things that are obsolete in 21st-century schools." Medium*. Retrieved from https://medium.com/@ingviomarsson/14-things-that-are-obsolete-in-21st-century-schools-891f3d1fe207

Omeh, C. B., Olelewe, C. J., & Hu, X. (2025). *Application of Artificial Intelligence (AI) Technology in TVET Education: Ethical Issues and Policy Implementation.* Education and Information technologies, 30(5), 5989-6018.

Poripo, J., Ede, E. O., Nwaodo, S. I., & Youdiowei, B. T. (2020). *Effect of Multiple Stress Management Intervention on Stress and Academic Performance of Automobile Technology Education Students in Universities in South-South, Nigeria*. Journal of Engineering and Applied Sciences, 15(9), 2121-2127.

ResearchGate. (2025). *Artificial Intelligence in Technical and Vocational Education and Training: Empirical Evidence, Implementation Challenges, and Future Directions*. Retrieved from https://www.researchgate.net/publication/391220934_Artificial_Intelligence_in_Technical_and_Vocational_Education_and_Training_Empirical_Evidence_Implementation_Challenges_and_Future_Directions

Reuters. (2024, November 19). *Auto sector scrambles to retool workforce for electric and automated future*. *Reuters*.

Uduafemhe, M. E. Ewim, D. R. E. & Karfe, R. Y. (2023). *Adapting to the new normal: Equipping career and technical education graduates with essential digital skills for remote employment.* ATBU Journal of Science, Technology & Education, 11(4), 51-62

Ujevbe, M., et al. (2020). *Kashere Journal of Education*, 7(2), 204-215. Retrieved from https://www.ajol.info/index.php/kje/article/view/293221/275944

UNESCO strategy for TVET (2022-2029): *Transforming technical and vocational education and training for successful and just transitions*. United Nations Educational, Scientific and Cultural Organization. https://unesdoc.unesco.org/ark:/48223/pf0000383159

Uzo, A. (2021). *Artificial intelligence in education: strategies for integration and implementation, Nigerian education research and development council (NERDC)* special Issue 12-26.

Vallejo Guevara, M. (2019). *AI-tools in learning for technical vocational education and training (TVET) in Malaysia.* International Journal of Science and Research Archive, 12(01), 2061-2068.