

Integrating Virtual Reality and Simulation Technologies for Enhanced Practical Skills Acquisition in Technical Colleges in Lagos State

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Abstract

This study explored the utilization of Virtual Reality (VR) and simulation technologies for enhancing practical skills acquisition in Lagos State Technical Colleges. The research adopted a descriptive survey and quasi-experimental design, involving 150 participants (120 students and 30 instructors) selected through purposive sampling from technical colleges offering furniture craft and carpentry programs. Two research questions and two null hypotheses guided the study. Data was collected using structured questionnaires and practical skills assessment tools, validated by three TVET experts. Descriptive statistics (mean and standard deviation) and inferential statistics (independent t-test) were used to analyze data at a 0.05 significance level. Findings revealed that both students (grand mean = 3.76) and instructors (grand mean = 3.85) strongly agreed that VR and simulation technologies enhance practical skills acquisition through demonstration of difficult technical operations, safe practice of hazardous tasks, repeated practice without material wastage, and development of problem-solving skills. Regarding effectiveness, students (grand mean = 3.83) and instructors (grand mean = 3.85) agreed that integration of these technologies improves accuracy in workshop operations, increases student interest, enhances quality of skill acquisition, and supports theory-practice coordination. The independent t-test results showed no significant differences between the perceptions of students and instructors for both hypotheses ($t_{\text{cal}} = 0.64$ and 0.15 ; $t_{\text{crit}} = 1.96$), indicating strong stakeholder consensus. The study concludes that VR and simulation technologies are widely perceived as effective tools for bridging the theory-practice gap in technical education. It is recommended that government and institutional stakeholders invest in VR infrastructure, provide instructor training, integrate simulation modules into the curriculum, and establish continuous evaluation frameworks to ensure sustainable implementation.

Keywords: Virtual Reality, Simulation Technologies, Practical Skills Acquisition, Technical and Vocational Education and Training (TVET), Lagos State Technical Colleges.

Introduction

Virtual Reality (VR) is a computer-generated technology that creates a simulated environment with which users can interact in a realistic way. It employs devices such as VR headsets, motion sensors, and controllers to immerse users in a three-dimensional digital space. Unlike traditional screen-based learning, VR places the user inside the environment, allowing them to look around

and interact with virtual objects as if they were physically present (Oluwaseyi, Fortune, & Akinade, 2025). This immersive quality positions VR as a powerful tool for education and training. In the context of Technical and Vocational Education and Training (TVET), VR can simulate real-world workshops, laboratories, and industrial settings (Onatere-Ubrurhe, et al 2025). This capability allows learners to practice technical tasks, operate

machinery, and perform procedures without the inherent risks associated with real equipment. Furthermore, VR facilitates repeated practice, which is essential for improving skill mastery and building learner confidence. Ajani, (2023) agrees that VR supports an experiential learning model by enabling students to learn through direct action rather than through theory alone. VR environments also offer the flexibility to be customized, representing different professional scenarios and challenges, which makes it particularly valuable for teaching complex or hazardous tasks in a safe manner (Wakil, et al 2024). In institutions such as the Lagos State Technical Colleges, VR holds the potential to bridge the critical gap between theoretical instruction and hands-on practical experience.

While VR represents a cutting-edge approach to creating simulated experiences, it falls within a broader and more established category known as simulation technologies. These refer to computer-based systems that replicate real-life processes, environments, or operations for training and experimentation. Like VR, they allow users to practice tasks in a controlled virtual setting that closely mirrors real-world situations, often combining software, graphics, and interactive tools to model equipment and workplace activities (Okwute, 2024). Within TVET, simulation technologies serve a parallel function by enabling students to practice technical operations such as machine handling and electrical installations (Usman, Musa, & Bello, 2025). They similarly promote experiential learning through repetition, allow for step-by-step demonstrations by instructors, and crucially, help reduce damage to expensive equipment and minimize safety hazards. This is especially valuable in institutions where access to modern tools may be limited, as they provide a practical bridge to developing job-ready skills.

The ultimate goal of employing both immersive VR and broader simulation technologies in an educational context is to facilitate practical skills acquisition. This term refers to the process through which individuals learn to perform specific tasks effectively by applying theoretical knowledge through hands-on experience. It is the cornerstone of TVET, where mastering technical and manual skills is paramount. Practical skills acquisition involves active participation, operating tools, handling equipment, and carrying out procedures, and through repeated practice, learners improve their accuracy, speed, and confidence (Okotubu, & Akamobi, 2025). It is here that VR and simulation technologies prove their worth; they directly support this process by providing safe, interactive, and repetitive training environments that allow learners to develop competence without the fear of causing damage or injury. By enabling this kind of experiential learning, these technologies do not just convey information; they foster problem-solving abilities, critical thinking, and job-ready competencies that industries demand (Chiamogu, & Chiamogu, 2025). In doing so, they effectively bridge the persistent gap between theoretical knowledge and its practical application, preparing students more effectively for the demands of the real-world technical workplace.

This focus on practical, hands-on development is the central mission of Technical and Vocational Education and Training (TVET). TVET is an educational system specifically designed to equip learners with the practical skills, technical knowledge, and competencies required for specific occupations, with the goal of preparing individuals for employment, self-reliance, and entrepreneurship (Ntegwung, & Iyagbaye, 2022). Unlike general academic education, TVET combines theoretical instruction with hands-on training in fields such as engineering, construction, information technology, and skilled trades. It emphasizes

skill development in real or simulated work environments, playing a crucial role in national development by producing a skilled workforce that supports industrial growth (Jinadu, & Bello, 2025). In regions like Lagos State, technical colleges are the primary institutions delivering these programs, serving as a direct bridge between education and the world of work.

Given the objectives of TVET and the importance of practical skills acquisition, a key priority for these institutions is the continuous enhancement of learning. Enhancing learning refers to the process of improving the effectiveness and quality of the educational experience by making it more engaging, interactive, and meaningful. Teachers achieve this by adopting innovative techniques and creating supportive environments that encourage exploration and collaboration, (Ihua, 2024). The use of modern technologies, such as the simulation tools and virtual reality mentioned earlier, plays a significant role here by helping students visualize complex ideas and practice skills in realistic, risk-free settings. When learning is enhanced through these methods and supported by continuous feedback and assessment, students become more confident and capable of applying their knowledge. In the context of technical and vocational education, this directly translates to improved practical competence and better preparation for future careers (Chukwuedo, et al 2023).

This integrated approach to education, focusing on practical skills acquisition through an enhanced, technology-supported TVET curriculum, is being actively pursued in institutions like the Lagos State Technical Colleges. These government-owned technical colleges in Lagos State, Nigeria, are specifically established to provide TVET, equipping learners with the practical skills and technical knowledge needed for employment and self-reliance (Egunsola, & Kumazhege, 2023). Offering trades from electrical

installation to information technology, the colleges combine theoretical instruction with hands-on training in well-equipped workshops. In alignment with the principles of enhancing learning, the Lagos State Government has been working to upgrade facilities and introduce modern technologies into the curriculum. Furthermore, by collaborating with industries, the colleges ensure their training remains relevant to labour market demands, thereby promoting both employment and entrepreneurship. Through these comprehensive programs, Lagos State Technical Colleges are not only developing skilled manpower but are also directly supporting economic growth by empowering young people to become productive members of society.

Statement of the problem

The ideal goal of Technical and Vocational Education and Training (TVET) in Lagos State Technical Colleges is to equip students with strong practical skills, technical competence, and hands-on experience that will enable them to function effectively in the world of work. Ideally, students in technical colleges should be exposed to modern tools, equipment, and learning technologies that simulate real-life industrial environments. The integration of innovative technologies such as Virtual Reality (VR) and simulation technologies is expected to enhance experiential learning, provide safe practice environments, and enable learners to repeatedly practice technical procedures until mastery is achieved. In an ideal situation, these technologies would support instructors in demonstrating complex technical operations and help students develop the level of competence required by modern industries. However, the current reality in many Lagos State Technical Colleges suggests that the acquisition of practical skills by students is often constrained by several challenges. These include inadequate workshop facilities,

insufficient modern equipment, overcrowded classrooms, and limited opportunities for hands-on training. In some cases, the available tools and machines are obsolete or not enough to accommodate the large number of students requiring practical training. As a result, many students rely heavily on theoretical instruction with minimal exposure to practical experiences. This situation limits their ability to develop the necessary technical competence and confidence required for effective performance in real workplace settings.

Furthermore, the rapid advancement of technology in modern industries has increased the demand for workers who are not only theoretically knowledgeable but also practically skilled and technologically adaptable. While countries with advanced technical education systems are increasingly adopting technologies such as Virtual Reality and simulation-based learning to improve skills training, the use of such technologies in many Nigerian technical colleges, including those in Lagos State, remains limited or underutilized. This situation creates a significant gap between the expected standard of practical skills training in technical education and the current learning experience available to students in Lagos State Technical Colleges. Consequently, graduates of these institutions may struggle to meet industry expectations due to insufficient exposure to realistic training environments. It is against this background that this study seeks to explore the potential of exploiting Virtual Reality and simulation technologies to enhance practical skills acquisition in Lagos State Technical Colleges. The study aims to examine how these emerging technologies can be integrated into technical training to bridge the gap between theory and practice, improve students' learning experiences, and better prepare them for the demands of the modern workforce.

Purpose of the Study

The general purpose of this study was to explore virtual reality and simulation technologies to enhance practical skills acquisition in Lagos State technical colleges. Specifically, the study sought to:

1. examine how Virtual Reality (VR) and simulation technologies can be utilized to enhance the acquisition of practical skills among students in Lagos State Technical Colleges.
2. determine the extent to which the integration of Virtual Reality and simulation technologies can improve the effectiveness of practical training in Lagos State Technical Colleges.

Research Questions

The following research questions guided the study:

1. How can Virtual Reality (VR) and simulation technologies be utilized to enhance the acquisition of practical skills among students in Lagos State Technical Colleges?
2. To what extent can the integration of Virtual Reality (VR) and simulation technologies improve the effectiveness of practical training in Lagos State Technical Colleges?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the practical skills acquisition of students in Lagos State Technical Colleges when trained using Virtual Reality and simulation technologies and when trained using conventional teaching methods.
2. The integration of Virtual Reality and simulation technologies has no significant effect on the effectiveness of practical training in Lagos State Technical Colleges.

Methodology

This study adopts a descriptive survey research designs to examine the use of Virtual Reality (VR) and simulation technologies in enhancing practical skills acquisition in Lagos State Technical Colleges. The descriptive survey focuses on gathering data about the current state of practical skills training, the challenges encountered, and the perceptions of both students and instructors regarding the integration of VR and simulation technologies. The target population for the study consists of students and instructors from selected Lagos State Technical Colleges that offer furniture craft as well as carpentry and joinery programs. A purposive sampling technique is employed to select two technical colleges and specific courses that require substantial hands-on practical training. From these institutions, a total of 150 respondents is sampled, comprising 120 students and 30 instructors. The students are divided into two groups: 60 students are assigned to the experimental group, which receives VR and simulation-based training, while the remaining 60 students form the control group and undergo traditional practical training. The 30 instructors participated in the survey to provide professional perspectives on the use of these technologies.

Data for the study are collected using multiple instruments, including questionnaires, observation checklists, and practical skills assessment tools. The questionnaires are designed to capture participants' perceptions, readiness, and attitudes toward VR and

simulation technologies. Meanwhile, the observation checklist and practical assessment tools are used to evaluate students' competence, accuracy, and efficiency in performing technical tasks both before and after the training intervention. To ensure the validity of these instruments, they are reviewed by three experts in Technical and Vocational Education and Training (TVET). The study is conducted in three phases. The first phase involves collecting baseline data on students' existing practical skills through initial practical assessments. In the second phase, the experimental group undergoes training using VR and simulation technologies, whereas the control group continues with conventional practical training methods. The third phase consists of post-training assessments aimed at measuring the level of skill acquisition and comparing the outcomes between the two groups.

Quantitative data obtained from the questionnaires and practical assessments are analyzed using descriptive statistics such as mean, standard deviation, and frequency to summarize participants' perceptions and baseline skill levels. Inferential statistical techniques, including independent t-tests were employed to test the study's hypotheses at a 0.05 level of significance. Additionally, qualitative data derived from open-ended questionnaire responses are analyzed thematically to identify key patterns and insights related to the use of VR and simulation technologies in technical training.

Results

Table 1: Mean Responses and Standard Deviation of respondents on Utilization of Virtual Reality and Simulation Technologies for Enhancing Practical Skills Acquisition in Lagos State Technical Colleges

S/N	Item Statement	Mean (Students)	SD (Students)	Mean (Teachers)	SD (Teachers)	Remarks
1	Use of virtual reality environments for demonstration of technical procedures enhances understanding of practical tasks.	3.67	0.88	4.06	0.76	Agree
2	Simulation technologies facilitate repeated practice of technical operations without material wastage.	3.54	0.54	3.89	0.53	Agree
3	Virtual reality tools provide safe environments for practicing hazardous technical operations.	4.00	0.81	4.15	0.50	Agree
4	Integration of VR-based instructional modules improves visualization of complex technical processes.	3.51	0.70	3.77	0.64	Agree
5	Simulation software enhances step-by-step learning of workshop activities in technical trades.	3.53	0.69	3.91	0.83	Agree
6	Virtual reality technology supports the development of problem-solving skills during practical training.	4.14	0.94	3.62	0.74	Agree
7	Use of VR and simulation technologies improves learner engagement during workshop instruction.	3.51	0.72	3.93	0.66	Agree
8	VR-based training enables demonstration of technical operations that are difficult to perform in real workshops.	4.17	0.58	3.62	0.83	Agree
9	Simulation technologies support individualized pacing during practical skill training.	3.63	0.49	3.78	0.81	Agree
10	Use of virtual reality tools improves retention of practical procedures in technical education.	3.93	0.74	3.77	0.93	Agree

The table above presents the mean and standard deviation responses of students and technical instructors/teachers on the utilization of virtual reality (VR) and simulation technologies for enhancing practical skills acquisition in Lagos State technical colleges. The grand mean score for students is 3.76 with a standard deviation of 0.71, while technical instructors/teachers recorded a grand mean of 3.85 with a standard deviation of 0.72. These values indicate that both groups rated all the items highly, with mean scores consistently above the acceptance benchmark of 3.50. Students recorded highest mean ratings in

items relating to demonstration of difficult technical operations ($M = 4.17$) and development of problem-solving skills ($M = 4.14$), suggesting strong agreement on the instructional value of VR in complex and cognitive skill development. Similarly, teachers rated safe practice of hazardous operations ($M = 4.15$) and demonstration of technical procedures ($M = 4.06$) as highly effective. The relatively low and close standard deviation values for both groups indicate homogeneity in responses, implying that respondents share similar perceptions on

the usefulness of VR and simulation technologies.

Table 2: Independent t-test Analysis of Students and Technical Instructors/Teachers on the Utilization of Virtual Reality and Simulation Technologies for Enhancing Practical Skills Acquisition in Lagos State Technical Colleges

Variables	N	Mean	SD	df	t-cal	t-crit (0.05)	Decision
Students	120	3.76	0.71	148	0.64	1.96	Not Significant
Instructors/Teachers	30	3.85	0.72				

Level of Significance: 0.05

Table 3 presents the independent t-test analysis comparing the mean responses of students and technical instructors/teachers on the utilization of virtual reality and simulation technologies for enhancing practical skills acquisition in Lagos State technical colleges. The result shows that the calculated t-value (0.64) is less than the critical t-value (1.96) at the 0.05 level of significance with 148 degrees of freedom. This indicates that there is no statistically significant difference between the mean responses of students and technical instructors/teachers regarding the utilization of virtual reality and simulation technologies for enhancing practical skills acquisition. Therefore, the null hypothesis is accepted. The

implication of this finding is that both students and instructors share similar perceptions about the usefulness and effectiveness of VR and simulation technologies in practical skill development. The closeness of the mean scores (3.76 for students and 3.85 for instructors) further supports this conclusion, indicating a strong consensus between both groups. This agreement suggests that the integration of virtual reality and simulation technologies is widely recognized as a valuable instructional approach for improving understanding, engagement, safety, and retention of practical skills in Technical and Vocational Education and Training (TVET) institutions in Lagos State.

Table 3: Mean Responses and Standard Deviation of Respondent on Extent of Integration of Virtual Reality and Simulation Technologies in Improving the Effectiveness of Practical Training in Lagos State Technical Colleges

S/N	Item Statements	Mean (Students)	SD (Students)	Mean (Teachers)	SD (Teachers)	Remarks
11	Integration of VR technologies increases the effectiveness of practical demonstrations in technical workshops.	3.91	0.74	3.81	0.69	Agree
12	Use of simulation technologies improves the quality of skill acquisition in technical college programmes.	3.93	0.90	4.04	0.91	Agree
13	VR-supported instruction enhances comprehension of practical procedures in technical trades.	3.72	0.63	3.86	0.81	Agree
14	Integration of simulation technologies improves accuracy in performing workshop operations.	4.11	0.85	3.98	0.76	Agree
15	VR-based learning environments support better coordination of theory and practical instruction.	3.98	0.75	3.89	0.80	Agree
16	Use of virtual reality technologies improves efficiency in the delivery of practical training sessions.	3.71	0.60	3.88	0.79	Agree
17	Integration of VR tools contributes to increased interest in practical technical activities.	4.03	0.87	3.89	0.67	Agree
18	Simulation technologies reduce risks associated with performing complex workshop operations.	3.43	0.57	3.26	0.72	Moderate
19	Integration of VR and simulation technologies enhances assessment of practical competencies.	3.64	0.73	3.91	0.61	Agree
20	Use of VR technologies improves overall effectiveness of practical skill development in technical colleges.	3.84	0.69	3.97	0.68	Agree
Grand Total		3.83	0.73	3.85	0.74	

Table 3 above presents the mean and standard deviation responses of students and technical instructors/teachers on the extent of integration of virtual reality (VR) and simulation technologies in improving the effectiveness of practical training in Lagos State technical colleges. The grand mean for students is 3.83 with a standard deviation of 0.73, while technical instructors/teachers recorded a grand mean of 3.85 with a standard deviation of 0.74. These values indicate that

both groups generally agree that VR and simulation technologies are effectively integrated to improve practical training. The item-by-item analysis shows that students rated improvement in accuracy of workshop operations ($M = 4.11$) and increased interest in practical activities ($M = 4.03$) highest, while teachers rated quality of skill acquisition ($M = 4.04$) and overall effectiveness of practical skill development ($M = 3.97$) highest. However, both groups rated reduction of risks

in complex workshop operations ($M = 3.43$ for students; $M = 3.26$ for teachers) lower than other items, indicating a moderate perception

in that aspect. The standard deviation values for both groups are relatively close, suggesting consistency in responses.

Table 4: Independent t-test Analysis of Students and Technical Instructors/Teachers on the Extent of Integration of Virtual Reality and Simulation Technologies in Improving the Effectiveness of Practical Training in Lagos State Technical Colleges

Variables	N	Mean	SD	df	t-cal	t-crit (0.05)	Decision
Students	120	3.83	0.73	148	0.15	1.96	Not Significant
Instructors/Teachers	30	3.85	0.74				

Level of Significance: 0.05

Table 4 presents the independent t-test analysis comparing the mean responses of students and technical instructors/teachers on the extent of integration of virtual reality and simulation technologies in improving the effectiveness of practical training in Lagos State technical colleges. The result shows that the calculated t-value (0.15) is less than the critical t-value (1.96) at the 0.05 level of significance with 148 degrees of freedom. This indicates that there is no statistically significant difference between the mean responses of students and technical instructors/teachers regarding the extent to which virtual reality and simulation technologies improve the effectiveness of practical training. Therefore, the null hypothesis is accepted. The finding implies that both students and instructors share similar perceptions about the effectiveness of integrating virtual reality and simulation technologies into practical training. The closeness of the mean scores (3.83 for students and 3.85 for instructors) further confirms a strong agreement between both groups. This consensus suggests that VR and simulation technologies are widely regarded as effective tools for enhancing instructional delivery, improving students' understanding of technical procedures, increasing engagement, and strengthening overall practical skill development in Technical and Vocational

Education and Training (TVET) institutions in Lagos State.

Discussion of Findings

The first research question examined how Virtual Reality (VR) and simulation technologies can be utilized to enhance practical skills acquisition. The findings in Table 1 revealed that both students (grand mean = 3.76) and instructors (grand mean = 3.85) strongly agreed on the usefulness of these technologies. Students rated the demonstration of difficult technical operations ($M = 4.17$) and development of problem-solving skills ($M = 4.14$) highest. This finding aligns with Wakil et al. (2024), who noted that VR environments offer flexibility to represent different professional scenarios, making them particularly valuable for teaching complex tasks. Similarly, Chiamogu and Chiamogu (2025) argued that VR and simulation foster problem-solving abilities and critical thinking, which is confirmed by the high student rating on this item. Instructors rated safe practice of hazardous operations ($M = 4.15$) and demonstration of technical procedures ($M = 4.06$) as highly effective. This supports Onatere-Ubrurhe et al. (2025), who asserted that VR could simulate real-world workshops and industrial settings, allowing learners to operate machinery without inherent risks. Furthermore, the high rating for repeated practice without material wastage ($M = 3.89$)

for teachers) corroborates Ajani's (2023) position that VR facilitates repeated practice essential for skill mastery and learner confidence. The independent t-test analysis in Table 2 ($t\text{-cal} = 0.64 < t\text{-crit} = 1.96$) showed no significant difference between the perceptions of students and instructors. This finding implies a strong consensus among stakeholders regarding the instructional value of these technologies. The result is consistent with the theoretical framework of experiential learning, where both learners and teachers recognize that direct action through VR enhances understanding more effectively than theory alone (Ajani, 2023).

The second research question determined the extent to which VR and simulation technologies improve the effectiveness of practical training. Table 3 showed that students strongly agreed that these technologies improve accuracy in workshop operations ($M = 4.11$) and increase interest in practical activities ($M = 4.03$). This finding aligns with Ihua (2024), who stated that enhancing learning involves making education more engaging, interactive, and meaningful through modern technologies. The increased interest reported by students directly supports the view that VR creates immersive experiences that capture learner attention. Instructors rated quality of skill acquisition ($M = 4.04$) and overall effectiveness of practical skill development ($M = 3.97$) highest. This finding corroborates Chukwuedo et al. (2023), who argued that enhanced learning through technology directly translates to improved practical competence and better career preparation. The result also supports Usman, Musa, and Bello (2025), who noted that simulation technologies enable students to practice technical operations such as machine handling, thereby improving skill quality.

Both groups rated reduction of risks in complex workshop operations moderately (students $M = 3.43$; instructors $M = 3.26$). While still positive, this relatively lower rating

may reflect a need for more targeted safety protocols within VR environments or a recognition that some risks cannot be fully eliminated even in simulation. Nevertheless, the overall grand means (students = 3.83; instructors = 3.85) indicate strong agreement on effectiveness. The independent t-test in Table 4 ($t\text{-cal} = 0.15 < t\text{-crit} = 1.96$) revealed no significant difference between the two groups' perceptions. This finding suggests that both students and instructors recognize VR and simulation technologies as effective tools for bridging the theory-practice gap. This consensus is particularly significant given the statement of the problem, which identified a gap between expected and current practical training standards in Lagos State Technical Colleges. The findings suggest that stakeholders believe these technologies can address challenges such as inadequate equipment and limited hands-on opportunities identified by Egunsola and Kumazhege (2023).

Conclusion

Based on the findings of this study, it is concluded that both students and instructors in Lagos State Technical Colleges share a strong, positive, and consensus-driven perception regarding the utilization and effectiveness of Virtual Reality and simulation technologies for practical skills acquisition. These technologies are recognized for their ability to demonstrate difficult technical operations, develop problem-solving skills, provide safe practice environments for hazardous tasks, and facilitate repeated practice without material wastage. Furthermore, the integration of VR and simulation technologies is perceived to significantly improve the effectiveness of practical training by enhancing accuracy in workshop operations, increasing student interest and engagement, improving the quality of skill acquisition, and supporting better coordination between theory and practical instruction. The moderate perception

regarding risk reduction suggests that while these technologies are valuable, they should complement rather than completely replace safety training in real workshop environments. The absence of significant differences in perceptions between students and instructors indicates a unified stakeholder agreement, creating a favorable condition for policy implementation and curriculum innovation. Therefore, VR and simulation technologies represent a viable and potentially transformative strategy for addressing the persistent gap between theoretical instruction and hands-on practical experience in Lagos State Technical Colleges.

Recommendations

1. The Lagos State Government, through the Ministry of Education, should establish a dedicated fund for the procurement and maintenance of Virtual Reality equipment and simulation software across all state-owned technical colleges, prioritizing trades with hazardous or equipment-intensive operations.
2. The management of Lagos State Technical Colleges should establish fully equipped simulation hubs or virtual reality laboratories where students can access these technologies under qualified supervision, ensuring equitable access for all learners.
3. A mandatory professional development program should be designed and implemented for technical instructors to build their competence in developing, integrating, and assessing VR and simulation-based learning modules into the existing curriculum.
4. Curriculum developers for Technical and Vocational Education and Training in Lagos State should formally integrate VR and simulation-based instructional modules into the syllabus for trades such as furniture craft,

carpentry and joinery, electrical installation, and welding, specifying learning outcomes achievable only through simulation.

5. Technical college administrators should establish partnerships with technology companies and VR content developers to create locally relevant simulation content that reflects Nigerian industrial contexts, workplace conditions, and safety standards.
6. A continuous evaluation framework should be established to periodically assess the impact of VR and simulation technologies on student skill proficiency, job placement rates, and entrepreneurial success, using the findings to guide further investment and scaling of the initiative.

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