

Employability Skill Development of Automobile Technology Students in a Work-Integrated Learning Environment: Barriers and Best Practices

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Abstract

In today's modern world, industries must compete to survive in the global market. Work-Integrated Learning (WIL) is widely considered instrumental in equipping new graduates with the required employability skills to function effectively in the work environment. Three research questions and hypotheses guided the study. The study population was 20 automobile technology education lecturers and 20 automobile engineers drawn through a simple random sampling technique. The instrument for data collection was a structured questionnaire. Mean and standard deviation (SD) were used to analyze the research questions. Independent sample t-tests were used to analyze the hypotheses, which determined the no relationship at ($P < .05$) significance level. Findings from the study revealed that teamwork, practical, and problem-solving skills are among the employability skills needed to be practiced by the students in a WIL environment. The study recommends, among others, that the lecturers/teachers should adopt appropriate teaching methods when teaching these students; more specifically, project-based learning, business simulation games, and self-directed learning strategies, among others, should be used. The curriculum should be reviewed occasionally to align with the current needs of the workplace and society.

Keywords: Employability Skills, Automobile Technology, Education, Best Practices, Barriers Work-Integrated Learning

Introduction

Automobile technology education (ATE) is one of the courses offered in technical education institutions, specifically at the Colleges of Education (COE) in Nigeria. Accordingly, Eze et al (2021) postulated that ATE enables students to acquire knowledge and skills for gainful employment and skills in the automobile technology field. Additionally, FRN (2014) considered automobile technology education as one of the Technical and Vocational

Education and Training Educators (TVET) programs offered in COEs in Nigeria's education system that provide individuals with the necessary skills, knowledge, and attitudes for effective employment in the teaching profession, and in automobile industries. Furthermore, the curriculum of ATE at the COE is designed to train students in automobile technology skills to secure employment or become employers of labor and to equally acquire the necessary pedagogical knowledge for teaching automobile courses in secondary schools and technical colleges. In this regard, Eze and Onwusa (2021) perceived ATE as the art of training leading to design, testing, diagnosis, service, and repair problems relating to conventional automobile vehicles and assembling the units by adhering to the manufacturers' specifications. Furthermore, the ever-increasing number of modern vehicles imported into Nigeria daily necessitates the need to acquire modern techniques and skills in diagnosing, fault detecting, and general maintenance of automobile engines.

Additionally, due to the dynamics in industries requiring employees who possess 21st-century employability skills, they need to refocus on the instructions of ATEs at COEs in Nigeria. As a result, students of ATE in COEs are expected to develop the needed employability skills to be up-to-date with the dynamics in the automobile industries for employment sustainability. ATE students are expected to be equipped with employability skills, which include technical skills, effective communication skills, interpersonal skills, initiative and enterprise skills, and ICT skills. Buttressing this, Dogara et al (2019); Nwambo et al (2022) stated that ATE students are required to be equipped with skills in critical thinking and creativity, collaborate with others, communicate clearly, and have an excellent technical background to succeed in their careers.

However, despite the significance associated with 21st-century employability, particularly in automobile technology, ATE graduates from COEs in Nigeria have been faulted for deficient employability skills and, for this reason, could not be employed by automobile industries in Nigeria. Automobile industries in Nigeria have complained about ATE students lacking skills in techniques and skills in diagnosing, fault detecting, part assembling, ICT, collaboration, teamwork, and critical thinking (Ujevbe et al., 2020). Also, Desai and Ramisetty-Mikler (2017) stated that ATE graduates lacked intellectual and technical skills, communication skills, interpersonal and leadership skills, adaptation and flexibility skills, the skills required for personal development, professional advancement, collaborative skills, critical thinking, creativity, information literacy, social skills, and productivity skills.

Similarly, Emmanuel and Victor (2022) stated that most automobile technology graduates lack the employability skills needed in automobile industries to carry out simple repairs, fault tracing, and other tasks. The authors further stated that the present curriculum of ATE at COE does not provide students with 21st-century employability skills, and as such, they are not fit for the present-day automobile industry. Idris et al (2020) identified that ATE students lack adaptability to new technologies, problem-solving, project management, and technical skills.

Regrettably, the inability of ATE graduates to exhibit appropriate automobile technology skills increased the unemployment rate in Nigeria, and as a result, graduate unemployment is growing astronomically in Nigeria. Perhaps it is in this regard that Adebayo (2022) posited that many graduates are turned out of Nigerian tertiary institutions every year without corresponding employment in the labor markets to absorb them or become self-employed. The unemployment situation has worsened such that graduates stay home for many years

and cannot find a job. Many graduates, despite their intimidating credentials, are either unemployed or underemployed. Some graduates lack the necessary skills because today's jobs and skills differ from what is taught in schools today (Goulart et al., 2022). Therefore, drastic measures are needed to curb the situation, and one solution is to empower students with 21st-century employability skills through an integrated work-learning environment.

Work Integrated Learning (WIL) environment is a 21st-century workplace where all activities are carried out based on the current needs and trends in society. In a WIL environment, students apply theoretical knowledge in real-world settings, gaining hands-on experience relevant to their field of study. This approach enhances their understanding and skills and prepares them for the demands of the workforce (Kay et al., 2021). The importance of a WIL environment lies in its ability to bridge the gap between academia and industry. It allows students to develop practical skills, problem-solving abilities, and a deeper understanding of their chosen field (Mesuwini & Mokoena, 2023). Khampirat (2021) stated that this experiential learning enhances employability as graduates enter the job market with a combination of theoretical and practical knowledge.

Moreover, studies about employability skills development have been undertaken by authors across the globe (Asiedu et al., 2024; Cammayo & Gonzales, 2024; Mahajan et al., 2022; Mainga et al., 2022; Noor et al., 2024; Sudarsono et al., 2024; Tan et al., 2022). Despite these studies, studying the Employability Skill Development of Automobile Technology Students in a WIL environment is crucial due to several reasons. First, it examines how education aligns with industry demands, particularly in the rapidly evolving field of automobile technology (Idris et al., 2020). This area needs to be studied because, despite ATE being a critical component of technical education in Nigeria, there is a reported skills gap among graduates. Significantly, this deficit has led to high levels of unemployment and underemployment within this demographic (Emmanuel & Victor, 2022)

The importance of the study lies in its potential to address these issues by investigating WIL environments. This relatively new educational approach offers students real-world experiences in their field of study, bridging the gap between academic theory and industry practice (Mesuwini & Mokoena, 2023). This, by exploring its effectiveness within Nigerian Colleges of Education, particularly in relation to ATE, the study could offer valuable insights into how to enhance graduate employability. The study's utility extends beyond just educators and students; it is also beneficial for automobile industries, which currently struggle to find adequately skilled employees among ATE graduates (Asiedu et al., 2024; Mahajan et al., 2022; Tan et al., 2022). Additionally, policymakers might use the findings to inform educational reforms that better align teaching with industry needs (Mahajan et al., 2022; Mainga et al., 2022; Noor et al., 2024). Therefore, the study aimed to determine the Employability Skill Development of Automobile Technology Students in a Work-Integrated Learning Environment. On this basis, the study is guided by the following research questions.

Research Questions

The following research questions were formulated to guide the study:

1. What employability skill is needed by automobile technology education students in the 21st-century workspace?

2. What employability skill is needed most by automobile technology education students in the 21st-century workspace?
3. What are the strategies for improving the employability skills of automobile technology education students in the 21st-century workspace?

Methodology

The descriptive survey research design was used for the study. It is a methodological approach that systematically gathers, analyzes, and interprets information to describe the present status of a particular phenomenon or group (Rahi, 2017). The study was conducted in the Middle Belt (North Central) Nigeria. The targeted population was 80, comprising 40 automobile technology education lecturers from colleges of education and 40 automobile engineers from the study area. The colleges of education are Niger State College of Education, Minna, Kwara State College of Education, Ilorin, Kwara State College of Education (Technical) Lafiagi, Nassarawa State College of Education, Agwanga, Benue State College of Education Katsinaaala, Federal College of Education, Pankshin, College of Technical Kabba and Kogi State College of Education Annkpa. A simple random sampling technique was employed to select 4 Colleges of Education. The 72 respondents comprised 36 automobile technology education lecturers from the Colleges of Education and 36 automobile engineers from the sampling area. However, the selection of the 72 respondents to represent the population was supported by Krejcie and Morgan's (1970) table for determining sample size. The instrument used for data collection was a structured questionnaire.

The questionnaire was subjected to face and content validation by three experts. The reliability of the questionnaire was established using Cronbach's alpha statistic, and a 0.91 reliability index was recorded. Mean statistics and standard deviation were employed to analyze data to answer the research questions, while the z-test was used to test the null hypotheses. The Statistical Package for the Social Sciences (SPSS) version 27 was used to analyze the data. Decisions on the research questions were based on the resulting means score interpreted relative to the concept of real lower and upper limits of numbers, as shown in Table 1. The standard deviation was used to decide on the closeness or otherwise of the respondents to the mean in their responses. Any item with a standard deviation of less than 1.96 indicated that the respondents were not too far from the mean or one another in their responses, and any item having a standard deviation equal to or above-stated value signified that respondents were too far from the mean.

Table 1

Interpretation of Four Point Scale

S/N	Scale of RQ 1 & 2	Scale of RQ 2	Scale of RQ 3	Point
1	Highly Needed	Highly Most Needed	Strongly Agreed	3.50 – 4.00
2	Needed	Moderately Most Needed	Agreed	2.50 – 3.49
3	Moderately Needed	Slightly Most Needed.	Moderately Agreed	1.50 – 2.49
4	Not Needed	Not Most Needed	Disagreed	0.50 – 1.49

Key: RQ = Research Question

Analysis of Results

The following research questions were formulated to guide the study:

Research Question 1: What employability skill is needed by automobile technology education students in the 21st-century workspace?

In Table 2, items 1 and 11, with the mean response ranges between 3.56 and 3.66, indicate that the respondents agreed that the skills are highly needed employability skills by automobile technology education students for the 21st-century workplace. Items 2, 3, 4, 5, 6, 7, 8, 9, and 10, with the mean ranges between 2.76 and 3.49, indicated that the respondents agreed with the items that they needed employability skills by automobile technology education students for the 21st-century workplace.

Table 2

Responses of automobile technology education lecturers and automobile engineers on the employability skill needed by automobile technology education students in the 21st-century workspace

S/N	Items	X ₁	X ₂	X _t	SD ₁	SD ₂	SD _t	D
1	Effective communication skill	3.75	3.50	3.66	.44	.51	.46	HN
2	Team Work skill	3.25	2.95	3.10	.85	1.05	.95	N
3	Information and Communication Technology skill	3.00	3.25	3.13	1.08	.85	.97	N
4	Problem-solving skill	3.25	3.05	3.15	1.07	1.32	1.19	N
5	Initiative and enterprise skill	3.65	3.15	3.49	.67	1.04	.89	N
6	Proactive skill	2.90	2.55	2.76	.91	1.09	1.00	N
7	Innovative skill	3.20	3.65	3.43	1.15	.67	.91	N
8	Planning and organization skill	2.50	3.10	2.80	1.15	.98	1.07	N
9	Self-management skill	3.00	3.15	3.08	1.21	1.04	1.23	N
10	Continue learning skill	2.75	3.00	2.88	1.07	.97	1.02	N
11	Technical skills	3.55	3.60	3.56	.69	.68	0.69	HN

KEY: X₁=Mean of automobile technology educators' lecturer, X₂=automobile engineer, X_t=Total mean, SD₁= Standard Deviation automobile technology educators' lecturer, SD₂= automobile engineer, SD_t= Total Standard Deviation, D=Decision, HN= Highly Needed and N= Needed.

Research Question 2: What employability skill is needed most by automobile technology education students in the 21st-century workspace?

In Table 3, item 1 has a response of 3.75, indicating that the respondents agreed that the skill is a highly needed employability skill by automobile technology education students for the 21st-century workplace. Items 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15, with the mean ranges between 2.60 to 3.15 indicated that the respondents agreed with the items that they are moderately mostly needed employability skills by automobile technology education students for the 21st-century workplace., item 16 with the mean respond 2.40 indicated that the respondent agreed that the skill is slightly mostly needed employability skills by automobile technology education students for the 21st-century workplace.

Table 3

Responses of automobile technology education lecturers on the employability skill needed most by automobile technology education students in the 21st-century workspace.

S/N	Items	Mean	SD	Decision
1	Technical skill	3.75	.44	HMN
2	Knowledge required in their special area	3.15	1.04	MMN
3	Proactive skill	3.10	1.07	MMN
4	Initiative and enterprise skill	3.10	.97	MMN
5	Interpersonal skill	3.00	.97	MMN
6	Information and Communication Technology skill	2.95	1.05	MMN
7	Innovative skill	2.95	.83	MMN
8	Self-management skill	2.80	1.01	MMN
9	Problem-solving skill	2.80	1.01	MMN
10	Theoretical skill	2.80	1.01	MMN
11	Effective communication skill	2.75	1.07	MMN
12	Team Work skill	2.70	1.03	MMN
13	Continue learning skill	2.75	.96	MMN
14	Information Technology skill	2.75	1.16	MMN
15	Entrepreneur skill	2.60	1.09	MMN
16	Multicultural skill	2.40	1.09	SMN

KEYS: SD = Standard Deviation, HMN = Highly Most Needed, MMN = Moderately Most Needed, and SMN = Slightly Most Needed.

Research Question 2: What employability skill is needed most by automobile technology education students in the 21st-century workspace?

In Table 3, items 1 and 2, with the mean response range between 3.57 and 3.53, indicate that the respondents agreed that the skill is highly needed employability skills by automobile technology education students for the 21st-century workplace. Items 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16, with the mean ranges between 2.50 to 3.20, indicated that the respondents agreed with the items that they are moderately most needed employability skills by automobile technology education students for the 21st-century workplace.

Table 3

Responses of automobile engineers on the employability skill needed most by automobile technology education students in the 21st-century workspace

S/N	Items	Mean	SD	Decision
1	Effective communication skill	3.57	.91	HMN
2	Entrepreneur skill	3.53	.85	HMN
3	Initiative and enterprise skill	3.20	.89	MMN
4	Proactive skill	3.15	1.03	MMN
5	Continue learning skill	3.15	.86	MMN
6	Information and Communication Technology skill	3.10	.97	MMN
7	Multicultural skill	3.10	.91	MMN
8	Theoretical skill	3.05	.83	MMN
9	Knowledge required in their special area	3.05	.99	MMN
10	Innovative skill	2.95	.83	MMN
11	Team Work skill	2.85	.93	MMN
12	Problem-solving skill	2.80	1.01	MMN
13	Technical skill	2.80	1.11	MMN
14	Information Technology skill	2.80	1.06	MMN
15	Interpersonal skill	2.80	1.28	MMN
16	Self-management skill	2.50	1.15	MMN

KEYS: SD= Standard Deviation, HMN= Highly Most Needed, MMN= Moderately Most Needed

Research Question 3: What are the strategies for improving the employability skills of automobile technology education students in a 21st-century workplace?

In Table 4, item 5, with a mean response of 3.53, indicates that the respondents agreed that the skill strongly agreed on strategies for improving employability skills by automobile technology education students for the 21st-century workplace. Items 1, 2, 3, 4, and 6, with mean ranges between 2.90 and 3.40, indicated that the respondents agreed with the items that they are strategies for improving employability skills by automobile technology education students for the 21st-century workplace.

Table 4

Responses of automobile technology education lecturers and automobile engineers on the strategies for improving employability skills of automobile technology education students in 21st-century workspace.

S/N	ITEM	X ₁	X ₂	X _t	SD ₁	SD ₂	SD _t	D
1	Collaborative education between colleges of education and industries.	3.25	3.40	3.33	.85	.88	0.87	A
2	Retooling of automobile workshops with sophisticated and updated tools and equipment	2.90	3.20	3.03	1.07	.89	0.98	A
3	Teaching automobile technology using Augmentation/virtual reality	2.75	3.05	2.90	1.12	.99	1.06	A
4	Re-Skilling of automobile technology lecturers on the 21 st -century skills needed in the workspace.	2.95	3.15	3.05	1.05	.99	1.02	A
5	Up-Skilling of automobile technology lecturers on the 21 st -century skills needed in the workspace	3.40	3.65	3.53	.88	.59	0.75	SA
6	Updating of automobile technology curriculum to suit the 21 st -century workspace	3.55	3.25	3.40	.89	.91	0.90	A

KEY: X₁=Mean of automobile technology educators' lecturer, X₂=automobile engineer, X_t=Total mean, SD₁= Standard Deviation automobile technology educators' lecturer, SD₂= automobile engineer, SD_t= Total Standard Deviation, D=Decision, A=Agreed and SA=Strongly Agreed.

Results and Discussion

The result of research question one on the employability skills needed by automobile technology education students in the 21st workplace revealed that effective communication, teamwork, information and communication technology, problem-solving, initiative and enterprises, proactive, innovative, planning and organization, self-management, continuous learning and technical skills are all needed by automobile technology graduates in the 21st-century workplace. Automobile technology graduates must possess appropriate and practical skills to succeed in the 21st-century workplace. If they fail to have the required technical skills, they will not be self-employed, employable, or be able to employ others. Even if they are self-employed, they may not be able to sustain that employment or business. The result agrees with the findings of Gouart et al (2022); Idris et al (2020) that communication, teamwork, problem-solving, initiative, enterprise, planning, organization, self-management, learning, and technology skills are needed in the 21st-century workplace.

Also, the study of Desai and Ramisetty-Mikler (2017); Trilling and Fadel (2012) are in line with this study by revealing the employability skills needed for graduates to be effective and transition smoothly from school to work, which includes intellectual and technical skills, communication skills, interpersonal and leadership skills, adaptation and flexibility skills, skills required for personal development, professional advancement, collaborative skill, critical thinking, creativity, information literacy, social skills, and productivity.

Research question two revealed the most needed employability skills by automobile technology education students in the 21st-century workplace. The study revealed the opinions of automobile technology education lecturers and automobile engineers. Technical skill is the most needed skill, followed by knowledge required in their particular area, and the last skill is the multicultural skill, as automobile technology education lecturers recommended. Automobile engineers believed that effective communication and entrepreneurial skills were the most needed skills by automobile technology graduates in the 21st-century workplace. This indicates a difference between what is being taught and what is required in the world of work. This study is in line with the study of Goulart et al (2022); Idris et al (2020) that employers and business educators differ in the essential skills students need to tackle the 21st-century global economy. They stressed further that business educators emphasize the importance of hard skills, while employers, on the other hand, emphasize soft skills.

Research question three revealed some of the strategies that could be employed to improve the employability of automobile technology graduates. The strategies are collaborative education between colleges of education and industries; retooling of automobile workshops with sophisticated and updated tools and equipment; teaching automobile technology using augmented/virtual reality; re-skilling of automobile technology lecturers; up-skilling of automobile technology lecturers on the 21st-century skills needed in the workspace and updating of automobile technology curriculum to suit the 21st-century workspace. These findings are in line with the suggestions of Amos et al (2022); Idris and Abutu (2019); Ujevbe et al (2020) on the strategies that could be employed to improve the employability of automobile technology graduates. This implies that there is a need for collaboration between colleges of education and the automobile industry, which will help impart the 21st-century skills needed in the automobile workplace. The teaching and learning of automobiles should be integrated with digital learning because the activities in the workplace are almost digital. There is also a need to update the automobile technology curriculum of colleges of education to suit the 21st-century workplace.

Conclusion

The high unemployment rate among graduates of automobile technology education in Nigeria can be traced to the curriculum, teaching techniques, and other factors. However, it can be reduced to a minimum if the institutions of learning can equip graduates with the employability skills needed for the 21st-century workplace. The study revealed employability skills needed by automobile technology graduates in the 21st-century workplace. It was also revealed that automobile technology lecturers and engineers should impart needed employability skills in the 21st-century workplace. Automobile technologists believe that technical skills are among the most needed skills.

In contrast, automobile engineers believe that communication and entrepreneurial skills are the most needed skills by automobile technology graduates in the 21st-century workplace. The study shows a need to align colleges' education curriculum with the 21st-century skills required in the workplace. Based on the identified employability skills needed and those needed most, as well as the strategies for improving the employability skills of automobile technology education students in the 21st-century workspace, the study recommended that lecturers/teachers should adopt appropriate teaching methods when teaching these students by using project-based learning, business simulation games, and self-directed learning

strategies among others. It is also recommended that the curriculum be reviewed occasionally to align with the current needs of the workplace and society. Finally, there should be a collaboration between the industry and technical and vocational education training institutions. Their programs should include components for teaching employability skills.

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