Engaging Girl Child in Automobile Skill for Self-Reliance among Female Technical College Students in Lagos State, Nigeria

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ABSTRACT

The current study investigated the acquisition of automobile skills for self-reliance among female Technical College students in Lagos State, Nigeria. The study was motivated by the need to address youth unemployment and the low participation of females in automobile technology programmes despite the potential of Technical and Vocational Education and Training (TVET) in promoting skill acquisition and economic independence. A descriptive survey research design was employed, the study participants being 92 female students of automobile technology sampled from technical colleges in Lagos State using Yamane's sampling technique. Structured questionnaires were used to collect data and descriptive statistics and ANOVA was used for analysis. It was concluded that the knowledge acquired in automobile technology significantly improves self-reliance as it imparts to the students with other skills like practical, entrepreneurial and employment skills. Some of the major problems identified by the respondents included lack of good workshop facilities, modern equipment, qualified instructors, and gender stereotypes, which affect the successful learning of skills. The study also revealed that the respondents were in favour of measures to improve the learning outcomes like provision of modern equipment, improved practical training, industrial exposure, and female participation. To enhance the self-reliance of female technical college students, the study recommends the strengthening of practical-oriented automobile technology education. It suggests better funding, infrastructure and gender inclusive policies that help in effective skills acquisition in TVET Institutions.

Keywords: TVET, automobile technology, female students, self-reliance, skill acquisition

INTRODUCTION

Technical and Vocational Education and Training (TVET) is known to be one of the major tools to acquire skills, create employment and promote national development. The objective of TVET in Nigeria as stated in the National Policy on Education is to provide people with practical and technical skills needed for self-reliance and economic productivity (FRN, 2013). There are also studies that have established the role of TVET in manpower development and entrepreneurial capacity to promote youth employment and national economic development (Okoye & Arimonu, 2016; Nwogu & Nwanoruo, 2011; Arogundade, 2011). However, it is often constrained by lack of adequate funding, poor infrastructure and training facilities, which have a negative effect on hands-on training of the students (Ayonmike et al., 2012).

In TVET, automobile technology education is a practical-based programme that aims to equip students with skills and competencies in vehicle diagnosis, servicing, maintenance and repairs, thus fostering employment and industry relevance (Saue, Chukuigwe, & Bassey, 2024). Technological development, especially related to electronic control systems and modern diagnostics on vehicles, is an increasingly important aspect of the field, and technical knowledge and training cannot be neglected (Lemo, 2024). The acquisition of skills in the field of automobile technology has been found to be more effective when using competency-based training with hands-

on experience than theory alone (Onwusa, Okotubu, & Oko, 2025). However, several technical institutions in Nigeria are still having difficulties with some problems like lack of workshop facilities, lack of modern equipment among others limiting effective practical training in education (Ayonmike et al., 2012; Muoghalu and Ahmad, 2026).

Furthermore, the socio-cultural norms, gender stereotyping and limited opportunities for hands-on training in technical occupations, which are traditionally male dominated, also hinder the participation of women in the automobile technology sector in Nigeria (UNESCO, 2012). This gender gap hinders female students' access to learning and skill building related to the automotive industry and their ability to be gainfully employed and economically empowered. To tackle the problems of joblessness and gender gap in TVET, it is crucial to understand how the acquisition of knowledge about automobile technology impacts the self-reliance of female technical college students.

Statement of the Problem

Technical and Vocational Education and Training (TVET) has emerged as an alternative route to self-reliance through the provision of skills and entrepreneurial capabilities for youth unemployment in Nigeria today (Okoye & Arimonu, 2016). Yet, its potential is not yet realised as the uptake of women in the field of automotive technologies remains low, with many of the female students encountering long-standing socio-cultural obstacles and restricted opportunities for hands-on training in traditionally male-dominated technical areas (UNESCO 2012). Lack of training support in the TVET institutions, lack of adequate workshop facilities are further factors that affect effective skill acquisition (Ayonmike et al., 2012). These challenges have raised concerns about the capacity and capability of the technical college female students in automobile technology to gain the necessary knowledge and put it into practice to attain self-reliance which led to the need for an empirical study in Lagos State, Nigeria.

Purpose of the Study

The main purpose of this study is to examine automobile technology knowledge acquisition and self-reliance among female technical college students in Lagos State, Nigeria. Specifically, the study seeks to:

1. Examine the impact of automobile knowledge acquisition on self-reliance among female technical students;

2. Identify the challenges affecting the acquisition of automobile knowledge among female technical students; and

3. Determine strategies for effective acquisition of automobile technology knowledge for self-reliance among female technical students.

Research Questions

The following research questions guided the study

1. What is the impact of automobile knowledge acquisition on self-reliance among female technical students?

2. What are the challenges affecting the acquisition of automobile knowledge among female technical students?

3. What strategies can enhance effective acquisition of automobile technology knowledge for self-reliance among female technical students?

METHODS AND MATERIALS

The study used descriptive survey research design. A total of 120 Government Technical College, Odomola and Government Technical College, Yaba, Lagos State students of automobile technology formed the population. Sample size was determined using Yamane's (1967) sample size formula:

$$n = \frac{N}{1 + N(e)^2}$$

where N = population size, n = sample size, and e = level of precision. With this model, the calculated sample size was 92.3 which was rounded to 92 respondents. The data were gathered through a structured questionnaire which included the following sections: Demographic items, Impact, Challenges, and Strategies The instrument was validated by experts on Technical and Vocational Education and Measurement and Evaluation and reliability was confirmed through Cronbach's Alpha. Mean and standard deviation were used to analyze the data which were collected immediately with the aid of research assistants. Mean scores of ≥ 2.50 were considered positive (agree) and < 2.50 were negative (disagree) using a decision rule of 2.50.

RESULTS AND DISCUSSION

Table 1: Distribution of school, class level, age range, workshop training participation, career intent, and access to tools among female technical college students (N=92)

Variable	Category	Frequency (n)	Percentage (%)
Name of School	Government Technical College, Odomola, Epe, Lagos.	31	33.7
	Federal Science and Technical College, Yaba.	30	32.6
	Government Technical College, Ikorodu, Lagos.	31	33.7
Class Level	Tech 1	13	14.1
	Tech 2	23	25.0
	Tech 3	38	41.3
	Tech 4	18	19.6
Age Range	10–13 years	24	26.1
	14–17 years	50	54.3
	18–21 years	18	19.6

Source: Compiled by the author using survey results.

Table 1 shows the demographic distribution of the respondents by the school, class level and age groups. Ideally, the sample was well spread across the three selected institutions with Government Technical College, Odomola having 33.7%, Government Technical College, Ikorodu 33.7% and Federal Science and Technical College, Yaba having 32.6% thus giving adequate representation to the institutions.

In terms of class level, most respondents were in Tech 3 (41.3%), followed by Tech 2 (25.0%), Tech 4 (19.6%), and Tech 1 (14.1%). That means that a higher percentage of respondents were in the intermediate level of technical training. Concerning the age distribution, the majority of respondents were aged 14-17 years (54.3%), 10-13 years (26.1%) and 18-21 years (19.6%), showing that the study mainly covered adolescents in the age Band 14-17 in the active technical education age bands.

Table 2: Reliability of the constructs and descriptive statistics of composite variables

Construct	Cronbach's Alpha	Number of Items
Impact	0.712	7
Challenges	0.803	7
Strategies	0.77	7

Source: Compiled by the author using survey results.

The reliability coefficients of the constructs of the study are presented in Table 2. Cronbach's alpha values of all variables were above the 0.70 level, which is generally considered the acceptable level of internal consistency. The highest reliability was found for the Challenges construct ($\alpha = 0.803$), followed by Strategies ($\alpha = 0.770$) and Impact ($\alpha = 0.712$). This showed the instrument could be used in further statistical analysis and the items measured the intended constructs.

Table 3: Impact of Automobile Technology Knowledge Acquisition on Self-Reliance Among Female Technical Students (N = 92)

S/N	Item Statement	Mean	SD	Decision
Impact 1	Automobile technology knowledge helps students develop practical repair and maintenance skills.	2.95	0.228	Agreed
Impact 2	Knowledge acquired in automobile technology can promote self-employment and self-reliance.	3.47	0.564	Agreed
Impact 3	Practical training in automobile technology improves students' confidence in handling vehicle faults.	3.12	0.465	Agreed
Impact 4	Automobile technology education prepares students for employment opportunities in the automobile industry.	3.53	0.564	Agreed
Impact 5	Skills acquired in automobile technology can help students generate income independently.	3.01	0.348	Agreed
Impact 6	Automobile technology knowledge improves students' problem-solving and technical abilities.	3.39	0.554	Agreed
Impact 7	Exposure to practical automobile work enhances students' readiness for entrepreneurship.	3.26	0.552	Agreed

Decision Rule: Mean ≥ 2.5 = Agreed; Mean < 2.5 = Disagreed.

As presented in Table 3, the overall general picture of the findings indicates that respondents were mostly agreeable that the knowledge of automobiles technology improves self-sufficiency of female students. High mean scores suggest that the programme enhances practical skills, employability, confidence and entrepreneurial readiness. The relevance of automobile education for career development was verified by the highest rating of the item which was "Automobile technology education prepares students for employment opportunities in the automobile industry (M = 3.53).

Table 4: Challenges Affecting Automobile Technology Knowledge Acquisition Among Female Technical Students (N = 92)

S/N	Item Statement	Mean	SD	Decision
Challenge 1	Inadequate workshop facilities affect effective learning of automobile technology.	3.65	0.479	Agreed
Challenge 2	Lack of modern automobile equipment limits students' practical knowledge acquisition.	3.84	0.371	Agreed

Challenge 3	Insufficient practical classes reduce students' understanding of automobile technology.	3.53	0.502	Agreed
Challenge 4	Shortage of qualified instructors affects students' acquisition of automobile skills.	3.82	0.39	Agreed
Challenge 5	Financial constraints prevent students from acquiring necessary practical tools.	3.64	0.482	Agreed
Challenge 6	Gender stereotypes discourage female students from participating actively in automobile technology.	4	0	Agreed
Challenge 7	Limited industrial exposure affects students' readiness for self-reliance.	3.62	0.488	Agreed

Decision Rule: Mean ≥ 2.5 = Agreed; Mean < 2.5 = Disagreed.

Table 4 reveals that most of the participants were in complete agreement that there were several factors which limit effective learning. The major problems are poor workshop facilities, shortage of modern equipment, lack of skilled instructors and financial problems. The most salient barrier was gender stereotypes (M = 4.00), reflecting socio-cultural barriers that persist in women's participation in automobile technology.

Table 5: Strategies for Enhancing Automobile Technology Knowledge Acquisition for Self-Reliance Among Female Technical Students (N = 92)

S/N	Item Statement	Mean	SD	Decision
Strategy 1	Provision of modern workshop equipment would improve students' practical skills acquisition.	3.79	0.407	Agreed
Strategy 2	Increased practical sessions would enhance students' competence in automobile technology.	3.96	0.205	Agreed
Strategy 3	Industrial training and internships would improve students' self-reliance skills.	3.67	0.471	Agreed
Strategy 4	Qualified instructors should be employed to improve automobile technology education.	3.95	0.228	Agreed
Strategy 5	Government support and funding would enhance effective automobile technology training.	3.7	0.463	Agreed
Strategy 6	Encouraging female participation in automobile technology would promote gender inclusion in technical education.	3.95	0.228	Agreed
Strategy 7	Regular exposure to modern automobile technologies would improve students' employability and self-reliance.	3.82	0.39	Agreed

Decision Rule: Mean ≥ 2.5 = Agreed; Mean < 2.5 = Disagreed.

Table 5 shows good consensus on strategies that can be used to improve automobile technology education. Interventions that emerged as key were increased practical sessions (M = 3.96), the use of qualified instructors (M = 3.95), and promotion of female participation (M = 3.95). This means hands-on training and inclusive policies are indispensable to better skill acquisition and self-reliance.

Table 6: Overall Descriptive Statistics of Study Variables (N = 92)

Construct	Mean	Median	Mode	Std. Deviation
Impact	3.2469	3.29	3.14	0.29277
Challenges	3.7283	3.71	3.71	0.28498
Strategies	3.8323	3.86	3.86	0.23259

Source: Compiled by author using survey results.

Table 6 indicated that the mean values of the all constructs were positive ranging from 3.25 to 3.83. Strategies (M = 3.83), Challenges (M = 3.73), and Impact (M = 3.25) recorded the highest, the next highest, and the lowest mean, respectively. Low standard deviations mean that the responses were consistent, and there was a high level of agreement among the participants.

Table 7: One-Way ANOVA Results Comparing Age Groups on Study Constructs

Construct	Age Group	Mean	F	df
	10–13 years	3.351	83.945	2,89
	14–17 years	3.369		
Impact	18–21 years	2.770		
	10–13 years	3.929	57.735	2,89
	14–17 years	3.534		
Challenges	18–21 years	4.000		
	10–13 years	3.994	32.736	2,89
	14–17 years	3.694		
Strategies	18–21 years	4.000		

Source: Compiled by the author using survey results.

Table 7 shows significant differences among all age groups in the constructs: impact ($F = 83.945$, $p < 0.05$), challenges ($F = 57.735$, $p < 0.05$) and strategies ($F = 32.736$, $p < 0.05$). This means that there is a high potential for age to affect how much people think they know about car technologies and how they learn them, as well as how autonomous they are.

Table 8: One-Way ANOVA Results Comparing Class Levels on Study Constructs

Construct	Class Level	Mean	F	df
	Tech 1	3.18	80.234	3,88
	Tech 2	3.36		
	Tech 3	3.43		
Impact	Tech 4	2.77		
	Tech 1	4.00	101.500	3,88
	Tech 2	3.34		
	Tech 3	3.74		
Challenges	Tech 4	4.00		
	Tech 1	4.00	180.641	3,88
	Tech 2	3.47		
	Tech 3	3.92		
Strategies	Tech 4	4.00		

Source: Compiled by author using survey results.

Table 8 reveals significant differences across class levels in impact ($F = 80.234$), challenges ($F = 101.500$), and strategies ($F = 180.641$), all at $p < 0.05$. This suggests that students' level of training significantly shapes their perception of skill acquisition, constraints, and improvement strategies.

DISCUSSION OF FINDINGS

The results reveal that the knowledge acquisition of automobile technology gives self-reliance among female students of technical college in Lagos, State. The overwhelming majority of respondents agreed that practical training in the field of automotive technology enhances employability, entrepreneurship, confidence and income generation. This agrees with Okoye and Arimonu (2016) and UNESCO (2016) who stated that TVET is a tool for self-reliance and youth empowerment and also with Saue et al. (2024), who stated that practical training in automobile is an important factor for the readiness to work.

The study also revealed that the lack of modern equipment, lack of qualified instructors, financial constraints, inadequate workshops and gender stereotypes are seen as impediments to the acquisition of skills. Gender stereotyping was especially important, in line with the findings of UNESCO (2012) which pointed to socio-cultural barriers to women's participation in technical education.

Recommendations that were strongly accepted included strategies that are of a practical nature like provision of better facilities, more hands-on training, qualified instructors, exposure to industry and female participation. This is in tune with Onwusa et al. (2025) who emphasized on competency-based training as a key for developing skills.

The results, however, are constrained by the selected schools in Lagos State and self-reported data that could have an impact on generalizability and accuracy. Future studies need to incorporate other regions, explore gender differences, and incorporate mixed methods to identify more comprehensive understanding of female involvement in the auto industry and long-term self-reliance results.

CONCLUSION AND RECOMMENDATION

Conclusion: The study concludes that acquisition of knowledge of automobile technology has a significant effect in improving the self-reliance of the technical college students of Lagos State female population. On the job exposure in the field of auto technology enhances the employability skills, entrepreneurial competence, confidence and earning potential of students. But the weaknesses of skill acquisition are poor workshop facilities, absence of modern equipment, less proficient trainer, financial constraints, and entrenched gender bias. These difficulties limit the full extent of self-reliance that female learners can achieve from learning about the automobile.

Recommendation: Based on the findings, the study recommends that:

1. Government and education stakeholders should improve funding for technical colleges to provide modern automobile workshops and equipment.
2. Schools should strengthen practical-based teaching by increasing hands-on training sessions in automobile technology.
3. Qualified instructors should be recruited and continuously trained to match current technological advancements.
4. Policies and awareness programmes should be implemented to reduce gender stereotypes and encourage greater female participation in automobile technology.
5. Students should be given more industrial exposure through structured internships and industry linkages to improve practical competence and self-reliance.

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