Curriculum Improvement Needs of Electrical and Electronics Technology Education Programme for Sustainable Self-Employment of Graduates of Nigeria Universities

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DOI: https://dx.doi.org/10.51244/IJRSI.2025.12110148

Received: 04 December 2025; Accepted: 08 December 2025; Published: 20 December 2025

ABSTRACT

This study investigated the curriculum improvement needs of Electrical and Electronics Technology Education Programme (EETEP) in Nigerian universities for graduates sustainable self-employment. Research questions and hypotheses were formulated based on the study objectives. A descriptive survey research design was adopted for the study and a sample of 80 respondents consisting of 20 lecturers, 28 industry workers, and 32 self-employed graduates was selected from the total population of 400. The instrument used in this study is questionnaire titled Curriculum Improvement Needs of Electrical and Electronics Technology Programmes in Nigerian Universities for Sustainable Self-employment (CINETP) and was validated. A reliability coefficient of 0.85 was obtained using Cronbach Alpha method to ensure the reliability of the instruments. The results from the findings of the research questions showed that all respondents have consensus on the need for curriculum enhancements in areas such as electrical installation, equipment maintenance, Radio and Television, and utilization of ICT integration which are crucial for equipping graduates with the expertise needed for sustainable self-employment. Statistical analysis, including one-way ANOVA, indicates no significant differences among the different respondent groups regarding the identified improvement needs. The study concludes that addressing these curriculum gaps is essential for equipping graduates with the necessary skills for sustainable self-employment, thereby contributing to economic development in Nigeria. Finally, it was recommended that skills relevant to the use of RCDs, home appliances, motor control centres, AFCIs, and smart gears to reduce power consumption, IoT, Autotronics, smart circuit boards of R & TV, Smart TV screen technologies maintenance skills, and SMDs should be included in the Electrical and Electronics Technology curriculum for graduates sustainable self-employment. Also, Digital marketing, online learning platform, AI, YouTube, ML and blockchain technologies should also be deployed in the teaching of Electrical and Electronics Technology Education.

Keywords: Curriculum, EETE, Sustainable Self-employment, Graduates

INTRODUCTION

Technical and Vocational Education (TVE) prepares students for the workforce through training and skill development. TVE training can only be accomplished if the curriculum is enhanced and enough educational resources and skilled teachers for teaching students the required skills are available. Vocational and technical education is designed to offer people the opportunity of improving themselves in their general proficiency, especially in relation to their present or future occupation (Bawa, 2018). The term "curriculum" describes the educational subjects, skills, standards, and objectives in educational programme. It describes the knowledge and skills that students should acquire at each academic level. Curriculum is frequently associated with words like structure, guidelines, substance of what to teach, and what the student has to learn. TVE curriculum aims to prepare students for specific occupations by providing specialized knowledge and practical skills that are directly

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue XI November 2025

relevant to the chosen career. Thus, TVE encourages the development of both practical and applied skills as w ell as the knowledge of fundamental scientific principles (Federal Republic of Nigeria, 2013).

The curricula of TVE for Bachelor of Technology education in Nigerian universities contain many competencies and skills that are expected from the graduates after the training, such as ability to carry out experiments in their relevant subject areas, competency in problem solving, competency in educational research and skill of improvisation among others. The technical contents of the TVE curriculum in Universities include metal workshop practice, woodwork technology, industrial safety, engine, lubrication and coiling system, land surveying, electrostatics/electromagnetic, measuring instrument & testing, semiconductor devices, mental fabrication, processes, machine tool processes, upholstery, woodwork practices, compression and ignition engines, braking, steering & suspension system, building construction superstructure, electrical power and machines, electronics communication, welding processes, foundry processes, structural fitting and fixtures, wood finishing, radio and television, metalwork technology, maintenance of woodwork equipment, electrical drafting, and wood design and conservation.

Electrical and Electronics Technology is one of the growing sectors in industrialized nations, and there is a strong need for qualified people in this field (International Labor Organization (ILO), 2018). In Nigeria, it has been highlighted as a viable sector for providing sustainable self-employment possibilities, and as such, it has a significant potential to contribute to the economic growth and development of the nation. However, there are concerns about the quality of education and training in this sector as offered by universities in Nigeria (Adedeji & Ajagba, 2018).

Generally, the rapid advancement of technology and the increasing demand for skilled professionals to meet the demands of the labor market called for equipping graduates of Electrical and Electronics Technology Education toward sustainable self-employment. Electrical and Electronics Technology Education programme in universities should focus on curriculum improvement to promote sustainable self-employment among students (Adeosun, Owolabi, Eshiet, & Owolabi, 2022). Self-employment is a condition of working for oneself as a freelance or the owner of a business who is an employer rather being an employee. Self-employed graduates derive more satisfaction from their work than salary workers. A self-employed person does not work for a specific employer who pays him consistently with salary. Self-employed persons may be involved in a variety of occupations that are highly skilled in a particular kind of work.

Needs for curriculum improvements is a crucial step in developing an effective curriculum that meets the needs of students, labor market, and society. There is a wide mismatch between the skills taught in the classroom and the skills required by the labor market (NBTE, 2015). This is because the curriculum does not adequately capture the rapid changes in several areas of electrical appliances, electronics devices in order to prepare students for real life situations, thus leaving them unprepared for the self-determining employment. Some of the major specific areas that requires improvements includes electrical installation, electrical equipment maintenance and repairs, and Television and Radio system for the purpose of enhancing graduate's sustainable self-employment. These are some of the potential areas that when improved upon in terms of skills acquisition can lead to professional development in skills of individuals and which enhances self-employment.

Electrical installation is part of the curriculum of Electrical and Electronics Technology Education as contained in the Benchmark Minimum Academic Standards (BMAS). Electrical installation wiring involves not only the traditional surface, conduit, and trunking wiring system, but POP fittings type of wiring, and different trunking type of wiring such as single compartment plastic trunking and multi compartment metallic trunking for technological advancements in order to groomed graduates in installation practices towards sustainable self-employment.

Similarly, Electrical and electronics equipment repairs, trouble shooting and maintenance works are part of the curriculum of Electrical and Electronics Technology Education in the university curriculum, it contains topics like measuring instruments direct current generators and motors, alternating current generators and motors, starting and control, fault finding in electrical power and DC machines, DC generator, DC motor, comparison of DC and AC motor, shun and series motor, induction motor, single phase motor, alternator of stepper motor, repairs and rewinding of motors are some of the main contents in the curriculum of Electrical and Electronics

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Technology Education. Aspect of some electronics equipment repairs, trouble shooting and maintenance are in the current Electrical and Electronics Technology Education curriculum, basic electronics devices like diodes, rectifiers, oscillators, semiconductor devices, electromagnetic waves, Boolean operations, integrated circuits, counters, flip flops, shift register counters, etc. are captured in the curriculum. This content does not address the modern electronics devices and components that are more miniatured in size and handles more complicated operations than the previous devices. Latest electronics devices such as smartphone, iPads, digitally operated washing machines, ovens, doors, air conditioners, wrist watches, 3D printers and scanners, home theatres, and other smart home appliances and gadgets exist and will continue to advance in the future (Zhang, Zhang, & Huang, 2018), however, they are not in the electronics contents of the curriculum for sustainable self-employment. To address such types of gaps in training students in the latest electronics appliance repairs, trouble shooting and maintenance, the curriculum needs to be improved and updated to capture these contents for successful integration and utilization in the universities for self-employment.

Radio and Television is in the curriculum of Electrical and Electronics Technology, it contains training contents like electronic communication systems, modulation and demodulation, RF & IF amplifiers, Transmission and propagation or electromagnetic waves, AM & FM receivers, television fundamentals, pictures transmission, trouble shouting and servicing of radio and television receivers (Adebayo & Ogunmakin, 2017). The contents can be improved to address some of the self-reliant training challenges which emanate due to advancement in technology such as miniature of the equipment, replacement of low voltage transformers with IoT sensors along with AI-driven analytic or medium voltage converters (switched capacitor and coupled inductor techniques), advancement and replacement of circuit boards of Radios and Televisions, use of Light Emitting Diode Liquid Crystal Display (LED LCD), Quantum Light Emitting Diode (QLED), and Organic Light Emitting Diode (OLED) in current televisions which is an advancement of Cold Cathode Fluorescent Lamps Liquid Crystal Display (CCFL LCD). This requires an upgrade in the training contents of Electrical and Electronics Technology Education in universities. Furthermore, Information and communication technology (ICT) assist in the delivery of the curriculum of Electrical and Electronics Technology of Nigerian universities as general education course, the contents are mainly for the proficiency on how to use ICT in obtaining educational information and how to use different search engine and Microsoft office. This limits the students' possibilities to incorporate ICT knowledge which will assist them in improving skills development for self-employments (Adeyemo & Ojo, 2019).

Hence, the needs for improvements of the Electrical and Electronics Technology Education curriculum in universities is essential for sustainable self-employment. The present study involved Lecturers of Electrical and Electronics Technology Education, self-employed graduates, and industry workers who studied Electrical and Electronics Technology Education in order to receive feedback from them on the need to include emerging technologies in all the aforementioned gray areas identified for updating the curriculum. By incorporating the findings upon completion of the study into the curriculum, universities can better prepare graduates for self-employment and contribute to the overall development of Nigeria and beyond.

STATEMENT OF THE PROBLEM

The Electrical and Electronics Technology sector in Nigeria is facing challenges in terms of providing opportunities for self-employment is always there. What may be lack of readiness among the graduates to exploits the opportunities due lack of good match between the skills and knowledge acquired through the current curriculum and the demands of the labor markets as provided by the objective of the programme (Adeyemi & Ogolla, 2021). This problem of declining self-employment skill training is brought about due to mismatch between the skills taught in the classroom and the skills needed by the labor market. Graduates have fewer necessary skills needed to function effectively as self-employed and become employer in the labor market. In addition, there are declining rate of preparation of graduates for real-life skills obtainable in the labor market for sustainable self-employment.

For any system that problems are identified, then there is need to provide a solution to the problems for effective improvement in that area. These problems identified in the curriculum of electrical and electronics technology education if not addressed, will lead to high increase in graduates poor training and poor performance and handling repairs, trouble shooting and maintenance of electrical and electronics equipment. Also, lack of

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updating curriculum to address current areas of concern in the 21st century skills leave graduates not well equipped in the electrical and electronics technology education programme (EETE), thereby rendering them less effective in the area of electrical installation, electrical and electronics equipment maintenance and repairs, Radio and Television, ICT aspect, among others.

Self-employment has been identified as the solution to the current unemployment facing Nigeria and the world at large, therefore, the best way to minimize unemployment is through preparing students for self-employment after graduation (Ojo, 2021). Current 21st century emerging skills identified in radio and television, electronics equipment repairs, trouble shooting and maintenance woks aspects, when incorporated into the curriculum of electrical and electronics technology education programme in universities will help in improving the graduate skills level for self-employment. The graduates will have the required knowledge and expertise in order to fit in the current century skills in the identified area for job creation, self-employment and an opportunity to employ others.

Employment generation and wealth creation is feasible through improvement of the curriculum in demanding areas of electrical and electronics technology education for training the graduates toward sustainable self-employment. It is not only hands-on-training that is required by graduates of electrical and electronics technology education but, also preparation to become job creators and employers of others. Accordingly, there is need to look at current demand of the labor market in order to provide relevant and updated curriculum contents in the specified area to serve the current reality for sustainable self-employment. Therefore, curriculum improvements need of electrical and electronics technology education offered by universities in Nigeria for sustainable self-employment is needed to meet the requirements of the labor market to ensure sustainable self-employment for the graduates.

PURPOSE OF THE STUDY

The main purpose of this study is to determine the curriculum improvements needs of electrical and electronics technology education programme in Nigeria universities for sustainable self-employment of Electrical and Electronics Technology Education graduates.

Specifically, the study:

1. Identify the improvements needs of electrical installation components of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates.

2. Identify the improvements needs of electrical and electronics equipment maintenance and repairs components of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates.

3. Identify the improvements needs of radio and television components of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates.

4. Identify the improvements needs of ICT aspect of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates.

RESEARCH QUESTIONS

The following research questions will guide the study.

1. What are the improvements needs of electrical installation components of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates?

2. What are the improvements needs of electrical and electronics equipment maintenance and repairs components of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates?

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3. What are the improvements needs of radio and television components of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates?

4. What are the improvements needs of ICT aspect of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates?

RESEARCH HYPOTHESES

The following null hypotheses were formulated to guide this study:

Ho_1: There is no significant difference in the mean responses of lecturers, industrial workers and self-employed graduates on the improvements needs of Electrical installation of the curriculum of universities.

Ho_2: There is no significant difference in the mean responses of lecturers, industrial workers and self-employed graduates on the improvements needs of electrical and electronics equipment maintenance and repairs of the curriculum of universities.

Ho_3: There is no significant difference in the mean responses of lecturers, industrial workers and self-employed graduates on the improvements needs of radio and television aspect of the curriculum of universities.

Ho_4: There is no significant difference in the mean responses of lecturers, industrial workers and self-employed graduates on the improvements needs of ICT aspect aiding tools in the universities.

METHODOLOGY

Descriptive survey research design was adopted for this study. This method of collecting and analyzing data aims to describe the characteristics or behaviors of a particular population, group, or phenomenon without manipulating or changing any variables (Babbie, 2016). In this research, a sample of participants was selected from the population of interest, and data is gathered through self-reported questionnaires. The data collected was then analyzed using statistical techniques to summarize the findings and draw conclusions.

The area of the study refers to the location where the researcher is conducting the survey. Hence, the study area is South-East Nigeria, specifically the states hosting the University offering Electrical and Electronics Technology Education in Enugu States of Nigeria. The target population in this research are is Four hundred (400) lecturers, industry workers, self-employed graduates in the area of the study. The self-employed graduates are those that graduated from Electrical and Electronics Technology Education programme and are working for themselves or are managing their workshop, while industry workers are specifically the Electrical and Electronics Technology Education graduates who secured employment in the industry.

The sample for the research involved Twenty (20) lecturers, Twenty-Eight (28) industry workers and Thirty-two (32) self-employed graduates, from the population of the study. The instrument used in this study is questionnaire titled Curriculum Improvement Needs of Electrical and Electronics Technology Programmes in Nigerian Universities for Sustainable Self-employment Questionnaire (CINETP). This helps in gathering the appropriate data for analysis.

One Electrical and Electronic Technology Education staff at Modibbo Adama University, Yola, one staff from Abubakar Tafawa Balewa University Bauchi and one from Northwest University, Kano validated the instrument. Face and content validation were conducted. For face validation, the validates scrutinized the items for appropriateness of grammar, and ambiguity in statements. Content validation was carried out to ascertain the inclusiveness of the content areas and to identify all the relevant skill contents of the various courses identified for the study. All the corrections made by the validates were duly incorporated in the final copy of the instrument for improvements. Also, a reliability coefficient using statistical analysis tool known as SPSS version 29 to determine the internal consistency of the instrument was obtained. Cronbach Alpha method of establishing reliability was used in order to determine the coefficient value of the questionnaire items. The α-value obtained for the instrument stood at 0.85, which make the instrument good and reliable for the study.

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RESULTS

Research Questions

The results of the four research questions are presented as follows:

Research Question 1: What are the improvements needs of electrical installation components of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates?

Table 1: Results of The Mean Response for Improvements Needs of Electrical Installation Components of Electrical and Electronics Technology Education Curriculum for Graduates Sustainable Self-Employment.

S/N	ITEMS	X_L	SD_L	X_{IN}	SD_{IN}	X_{SE}	SD_{SE}	X_{MOM}
1	Infusing automated power saving design into the curriculum to improve graduates' skills in electrical installation work.	4.60	.55	4.43	.79	4.38	.52	4.46
2	Updating the electrical installation module to provide more skills and power integrated boards with cable connections	4.00	.71	4.43	.54	4.53	.54	4.35
3	Inclusion on modern safety skills in electrical installation module of the EET curriculum	4.20	.45	4.00	.58	4.38	.74	4.18
4	Addition of skills on the use of Residual Current Devices (RCDs) in the electrical installation section of Electrical/Electronics Technology curriculum	4.20	.45	4.57	.54	3.88	1.36	4.24
5	Including wiring for motor control centers, transformers, and switchgear in electrical installation section of EET	4.40	.55	4.14	.90	4.25	1.17	4.24
6	Incorporating skills in automated power saving design, remote sensing, tracking surveillance systems and smart home technologies in electrical installation section	4.80	.45	4.57	.79	4.25	1.04	4.52
7	Inclusion of safety skills in electrical installation module of the Electrical/Electronics Technology curriculum to enhance less hazardous environment.	4.60	.55	4.43	.79	4.38	.74	4.46
8	Integration of smart grids/meters in electrical installations section of EET curriculum to provide opportunity for repairs.	4.40	.55	4.00	1.00	4.13	1.13	4.15
	GRAND SD AND MEAN						**.73**	**4.20**

Source: Field Survey, 2024

KEY:

X_{MOM}- Mean of Means

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X_L-Mean of Lecturers,

X_{IN} -Mean of Industry Workers**,**

X_{se} – Mean of Self-Employed graduate**,**

$SD_{L,}$ - Standard Deviation of Lecturers**,**

SD_{IN} - Standard Deviation of Industry workers**,**

SD_{se} -Standard Deviation of Self-employed graduates

For the Eight questionnaire items presented in table 1, all the different categories of the respondents scored them high, ranging from 3.88 to 4.80 with a standard deviation of 0.45 to 1.36. The grand mean of the research question stands at 4.20. Thus, for research question one, all the respondents agreed with the improvements needs with regards to electrical installation component for sustainable self-employment of graduates.

Research Question 2: What are the improvements needs of electrical and electronics equipment maintenance and repairs components of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates?

Table 2: Results of the Mean Response for Improvements Needs of Electrical and Electronics Equipment Maintenance and Repairs Components of the Curriculum for Graduates Sustainable Self-Employment.

S/N	ITEMS	X_L	SD_L	X_{IN}	SD_{IN}	X_{SE}	SD_{SE}	X_{MOM}
1	Inclusion of maintenance and repairs of electrical/electronic equipment like 3D printers and scanners for real-world applications in electrical electronics technology curriculum	4.60	.55	4.14	.69	4.50	.76	4.38
2	Adding calibration equipment maintenance and repairs of electrical/electronic aspect of electrical and electronics technology curriculum would enhance graduates' skills.	4.60	.55	4.29	.76	4.38	.52	4.40
3	Inclusion of modern safety standards to ensure safety in electrical equipment repairs and settings of electronics devices in the electrical electronics technology curriculum to minimize dangerous work situations.	4.40	.55	4.14	1.07	4.63	.52	4.38
4	Incorporating maintenance and repairs regarding software, Internet of Things (IoT) for remote sensing and monitoring system to predict component failure in the electrical electronics technology curriculum	4.40	.55	3.86	1.46	4.38	.52	4.18
5	Inclusion of maintenance and repairs regarding Autotronics wiring in the electrical electronics technology curriculum	4.60	.55	4.14	1.22	4.63	.52	4.43
6	Inclusion of maintenance and repairs skills of prevalent surface-mounted devices (SMDs)	4.80	.45	4.43	1.13	4.63	.52	4.60

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	and miniature electronics equipment in electrical electronics technology curriculum.							
7	Adding maintenance and repairs of panel circuit and smart devices like doors, phone, watches in the electrical electronics technology curriculum to boost graduate skills	4.40	.55	4.57	.54	4.50	.54	4.50
8	State-of-the-art instruments needed for fault finding should be part of the electrical electronics technology curriculum.	4.20	.45	4.14	1.07	4.63	.51	4.33
	GRAND SD AND MEAN						**.67**	**4.41**

Source: Field Survey, 2024

For the 8-questionnaire items presented in table 2, all the different categories of respondents scored them at high rate (above 4.00), except item 4 which was rated 3.86 by industry workers. Nonetheless, the grand mean of the research question under consideration stood at 4.41. This rating indicates a collective agreement of all the respondents with regards to the improvements needs of electrical and electronics equipment maintenance and repairs components of the curriculum for graduates sustainable self-employment.

Research Question 3: What are the improvements needs of radio and television components of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates?

Table 3: Results of the Mean Response for Improvements Needs of Radio and Television Components of the Curriculum for Graduates Sustainable Self-Employment.

S/N	**ITEMS**	$\mathbf{X_L}$	$\mathbf{SD_L}$	$\mathbf{X_{IN}}$	$\mathbf{SD_{IN}}$	$\mathbf{X_{SE}}$	$\mathbf{SD_{SE}}$	$\mathbf{X_{MOM}}$
1	Smart circuit boards for Radio and Television (RTV) repairs should be included in electrical electronics technology curriculum	4.00	1.00	4.29	1.11	4.63	.74	4.38
2	Inclusion of Light -Emitting Diodes (LED) and Liquid Crystal Displays (LCD) technology of recent televisions in the electrical and electronics technology curriculum.	4.60	.55	4.23	.76	4.13	.99	4.31
3	Inclusion of Quantum and Organic technology in current televisions section of the EET curriculum.	4.40	.55	4.86	.38	3.88	1.36	4.40
4	Adding high-definition (HD) and Ultra-High-Definition (UHD) picture quality technology into the Radio and Television aspect of electrical and electronics technology curriculum.	4.60	.55	4.43	.54	4.25	1.17	4.41
5	Adding the technology behind built-in Wi-Fi and internet connectivity in Radio and Television module of electrical/electronics.	5.00	.00	4.29	.76	4.38	1.06	4.50

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6	Incorporating troubleshooting of the Radio and Television stream technology to equip graduates toward sustainable self-employment	4.40	.55	4.00	1.00	4.25	.71	4.19
7	Smart TV browsing, social media Apps and interactive features should be integrated into TV section of electrical/electronics technology curriculum.	4.60	.55	4.00	1.00	4.63	.52	4.37
8	Smart TV screen technology maintenance should be integrated into the TV section of electrical/electronics technology curriculum.	4.40	.55	4.14	.69	4.33	.52	4.29
	GRAND SD AND MEAN						**.73**	**4.37**

Source: Field Survey, 2024

Eight questionnaire items addressing research question three are presented on table 3. The pattern of rating is not different from the previous research questions, with exception of item number 3 which was rated 3.88 by self-employed graduates, all the remaining items were rated above 4.00. The grand mean stood at 4.37. This also shows that there is a harmonious agreement among the different categories of respondents about the improvements needs suggested for the Radio and Television component of the curriculum for effective graduates' sustainable self-employment.

Research Question 4: What are the improvements needs of ICT aspect of the curriculum for sustainable self-employment of Electrical and Electronics Technology Education graduates?

Table 4: Results of the Mean Response for Improvements Needs of ICT Aspect of the Curriculum for Graduates Sustainable Self-Employment.

S/N	**ITEMS**	$\mathbf{X_L}$	$\mathbf{SD_L}$	$\mathbf{X_{IN}}$	$\mathbf{SD_{IN}}$	$\mathbf{X_{SE}}$	$\mathbf{SD_{SE}}$	$\mathbf{X_{MOM}}$
1	Digital marketing and data analytics should be incorporated in the electrical/electronics technology curriculum.	4.80	.45	4.71	.49	4.63	.74	4.70
2	Inclusion of teaching and learning platforms and Trello skills in electrical/electronics technology curriculum	4.40	.55	4.57	.54	4.25	.46	4.42
3	Incorporation of digital simulation software and Computer-Aided Design (CAD) in electrical/electronics technology curriculum.	4.60	.55	4.29	.49	4.13	.64	4.31
4	Adding structured programming languages in electrical/electronics technology curriculum.	4.60	.55	4.57	.54	4.50	.54	4.55
5	Inclusion of artificial intelligence (AI) in electrical/electronics technology	4.60	.55	4.14	.69	4.25	.46	4.29
6	Inclusion of internet enabled smart boards and projectors for multi-media instructional	4.60	.55	4.43	.79	4.38	.74	4.46

	delivery in electrical/electronics technology education curriculum.							
7	Inclusion of Block-chain technology and machine learning (ML) in electrical/electronics technology curriculum	4.40	.55	4.14	.90	4.75	.71	4.42
8	Deployment of sustainable infrastructure of ICT devices and online coding skills in electrical/electronics technology curriculum.	4.20	.45	4.14	1.07	4.50	.76	4.28
	GRAND SD AND MEAN						**.82**	**4.44**

Source: Field Survey, 2024

All respondents gave the statement a high rate of agreement, with all categories of the respondents scoring the items over 4.00. The eight questionnaire items in table 4 correspond to the answers to research question four. This indicates that the opinions of lecturers, industry workers, and self-employed graduates are similar and in agreement with one another for all the items. The grand mean was found at 4.44. This also demonstrates that all respondent categories agreed about the recommendations for the improvements needs of the ICT component of the curriculum enabling graduates to pursue sustainable self-employment.

Testing Hypotheses

The four (4) hypotheses were tested using one-way ANOVA at 0.05 level of significance. The results are presented as follows:

Ho_1: There is no significant difference among the mean responses of lecturers, industrial workers and self-employed graduates on the improvements needs of Electrical installation of the curriculum of universities.

Table 5: One-way ANOVA on the Mean Ratings of Lecturers, Industrial Workers and Self-Employed Graduates on the Improvements Needs of Electrical Installation component of the Curriculum of Universities for Graduates Sustainable Self-employment.

	Sum of Squares	**df**	**Mean Square**	**F**	**p-value**	**Decision**
Between Groups	0.644	2	0.322	0.540	0.637	Ho_1 Upheld
Within Groups	10.875	77	0.640			
Total	**11.519**	**79**				

Source: Field Survey, 2024

From table 5, the p value (p =0.637) is greater than the significant value 0.05; this indicated that there is no significant difference in the responses of lecturers, industrial workers and self-employed graduates on the improvements needs of Electrical installation of the curriculum of universities for graduates sustainable self-employment. Hence, fail to reject the hypothesis.

Ho_2: There is no significant difference among the mean responses of lecturers, industrial workers and self-employed graduates on the improvements needs of electrical and electronics equipment maintenance and repairs of the curriculum of universities.

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Table 6: One-way ANOVA on the Mean Ratings of Lecturers, Industrial Workers and Self-Employed Graduates on the Improvements Needs of Electrical and Electronics Equipment Maintenance and Repair Components of the Curriculum of Universities for Graduates Sustainable Self-employment.

		Sum of Squares	Df	Mean Square	F	p-value	Decision
	Between Groups	0.714	2	0.353	0.588	0.584	Ho_2 Upheld
	Within Groups	9.649	77	0.568			
	Total	**10.363**	**79**				

Source: Field Survey, 2024

From table 6, the p value (p =0. 584) is greater than the significant value 0.05; this indicated that there is no significant difference in the response of lecturers, industrial workers and self-employed graduates on the improvements needs of electrical and electronics equipment maintenance and repairs of the curriculum of universities for graduates sustainable self-employment. Hence, fail to reject the hypothesis.

Ho_3: There is no significant difference among the mean responses of lecturers, industrial workers and self-employed graduates on the improvements needs of radio and television aspect of the curriculum of universities.

Table 7: One-way ANOVA on the Mean Ratings of Lecturers, Industrial Workers and Self-Employed Graduates on the Improvements Needs of Radio and Television Aspect of the Curriculum of Universities for Graduates Sustainable Self-employment.

		Sum of Squares	Df	Mean Square	F	p-value	Decision
	Between Groups	1.257	2	0.633	0.900	0.494	Ho_3 Upheld
	Within Groups	11.444	77	0.670			
	Total	**12.701**	**79**				

Source: Field Survey, 2024

From table 7, the p value (p =0. 494) is greater than the significant value 0.05; this indicated that there is no significant difference in the response of lecturers, industrial workers and self-employed graduates on the improvements needs of radio and television aspect of the curriculum of universities for graduates sustainable self-employment. Hence, fail to reject the hypothesis.

Ho_4: There is no significant difference among the mean responses of lecturers, industrial workers and self-employed graduates on the improvements needs of ICT aspect of the curriculum of universities. ‘

Table 8: One-way ANOVA on the Mean Ratings of Lecturers, Industrial Workers and Self-Employed Graduates on the Improvements Needs of ICT Aspect of the Curriculum of Universities for Graduates Sustainable Self-employment.

		Sum of Squares	Df	Mean Square	F	p-value	Decision
	Between Groups	0.494	2	0.317	0.599	0.614	Ho_4 Upheld
	Within Groups	7.062	77	0.416			

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	Total	**7.556**	**79**				

Source: Field Survey, 2024

From table 8, the p value (p =0. 614) is greater than the significant value 0.05; this indicated that there is no significant difference in the response of lecturers, industrial workers and self-employed graduates on the improvements needs of ICT aspect of the curriculum of universities for graduates sustainable self-employment. Hence, fail to reject the hypothesis.

FINDINGS OF THE STUDY

Based on the results of the analyses of data relating to the research questions posed and hypotheses tested, the findings of the study are as follows:

1. The lecturers, Industry workers and self-employed graduates agreed with all the items as the grand mean of the responses is 4.20 more than the 3.50 decision level for acceptance; and hypothesis one indicates that there is no significant difference in the mean responses of the lecturers, industry workers and self-employed graduates. Hence, H_{o1} is upheld.

2. The lecturers, Industry workers and self-employed graduates agreed with all the items as the grand mean of the responses is 4.41 above the 3.50 which the decision level for acceptance was based; and the hypothesis two indicates there is no significant difference in the mean response of the lecturers, industry workers and self-employed graduates. Therefore, H_{o2} is upheld.

3. The lecturers, Industry workers and self-employed graduates agreed with all the items as the grand mean of the responses is 4.37 above the 3.50 decision level for acceptance; and the hypothesis three indicates there is no significant difference in the mean response of the lecturers, industry workers and self-employed graduates. Therefore, H_{o3} is upheld.

4. The lecturers, Industry workers and self-employed graduates agreed with all the items as the grand mean of the responses is 4.44 above the 3.50 decision level for acceptance; and the hypothesis four indicates there is no significant difference in the mean response of the lecturers, industry workers and self-employed graduates. Hence, H_{o4} is upheld.

SUMMARY OF THE STUDY

A study to investigate the curriculum improvements needs of EETE Programme in Nigerian universities for sustainable self-employment was conducted in Nsukka, Enugu with the aim of identifying grey areas in EE TE. Four (4) research questions and four (4) hypotheses ware posed in the study.

Descriptive survey research design was adopted for this study. The population of the study is Twenty (20). The target population in this research were lecturers, self-employed graduates, and industry workers in the area of the study. The sample of the present study are twenty (20) lecturers, thity two (32) industry workers, and twenty-eight (28) self-employed graduates. The instrument used in this study is questionnaire titled CINETP. The data collected was then analyzed using statistical techniques to summarize the findings and draw conclusions. Three experts validated the questionnaire in terms of content and organization. Moreover, a reliability coefficient of 0.85 was obtained using Cronbach Alpha.

All the three groups of respondents agreed with the items in all the research questions, and the respondents agreed that hypotheses I and 4 indicate no significant difference in the mean difference of agreements of the Lecturers, Industry workers and self-employed graduates, as findings from the study were clearly stated.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue XI November 2025

CONCLUSION AND OBSERVATIONS

The study to investigate the curriculum improvements needs of electrical and electronics technology education programme in university of Nigeria, Nsukka for sustainable self-employment was carried out. The study identified how some of the items can improve the learning of the contents of the four identified areas in electrical and electronics technology education. The three groups of the respondents (Lecturers, Industry workers, and self-employed graduates) agreed with the items. Furthermore, the study identified that there is no significant mean difference among the agreements of Lecturers, Industry workers, and self-employed technologist of all the items in the questionnaire.

RECOMMENDATIONS

The following recommendations were advanced in the present study:

1. More skills on the use of RCDs, modern safety, home appliances, motor control centers, switch gears, automated power saving design, remote sensing, smart home technologies, AFCIs, and smart gears to reduce power consumption should be integrated in the curriculum for graduates sustainable self-employment.

2. Skills relevant to maintenance of electrical and electronics technologies which signify impacts upon the real world and applicable to users' environment, such as IoT, Autotronics, 3D printers, and smart devices, and SMDs should be included in the Electrical and Electronics Technology curriculum for graduates sustainable self-employment.

3. Smart circuit boards of R & TV, LEDs and LCDs technologies, Quantum and Organic LEDs technologies, technology behind built-in Wi-Fi and internet in RTV, troubleshooting of the RT stream technologies, Smart TV browsing, social media Apps and interactive features and Smart TV screen technologies maintenance skills should be included for graduates sustainable self-employment.

4. Digital marketing, online learning platform and coding, CAD, programming language, AI, YouTube, ML and blockchain technologies skills should be incorporated for graduates sustainable self-employment.

ETHICAL APPROVAL

The ethical approval has been sought from all that are involved in the research.

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