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Lifelong Learning Strategies for Enhancing Responsiveness of Technology Education Programmes for Labour Market Dynamics in Rivers State

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ABSTRACT
To keep technology education graduates relevant and employable in a dynamic labour market, there is need for lifelong learning. This study was conducted to determine the extent to which lifelong leaning strategies such as up-skilling and Industrial-academia partnership enhanced the responsiveness of technology education programme in Rivers State. Two research questions guided the study and two null hypotheses were tested at 0.05 level of significance. Descriptive survey design was adopted, and a population of 30 technology education graduates and their employers was studied. Census sampling was employed due to the manageable population. A 5 point scale questionnaire containing 20 items in two clusters (B1-B2) was used for data collection. The instrument was validated by experts; Cronbach alpha reliability test was used after pilot testing which yielded overall coefficient of 0.84. A total of 30 copies of the instrument was administered and retrieved. A descriptive statistics of mean and standard deviation was used to answer the research questions while t-test was used to test the hypotheses at 0.05 level of significance. The findings revealed that all the 20 items highly enhanced the responsiveness of technology education. The two stated hypotheses were accepted. Based on the findings, the researcher concluded that there is need for integration of lifelong learning strategies into the technology education curriculum. Technology education teachers and instructors must be informed at all times on innovations in tools, equipment in order to align themselves with labour market dynamics.
Keywords: Lifelong Learning, Technology Education, Responsiveness. Labour Market Dynamics

INTRODUCTION

The Nigeria labour market is becoming too dynamic, due to rapid technological advancements and digital globalization. Invention of highly computerized and automated machines and equipment are on the increase. Rivers State, as the center of the oil and gas activities has recently noticed same in its labour market with diverse modern tools, methods and equipment. According to Wenchong et al (2024), recent trends indicate a growing demand for a workforce proficient in diverse technological fields such as information and communication technology (ICT), automated machines/electronics, robotics and artificial intelligence. Studies such as that of Okoye and Maxwell (2016) indicate that such dynamism in the labour

market requires an educational program such as technology education that can produce graduates equipped with both technical and soft skills to meet the demands of a dynamic labour market.

Technology and Vocational Education, according to Odika and Tom (2020), is the trendy and unique system by which trained manpower is produced for economic and industrial growth of any country of the world including Nigeria. The Federal Republic of Nigeria, in her National Policy on Education (2013) added that Technical and Vocational Education is used as comprehensive term referring to those aspect of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in the sectors of economic and social life. In addition, the national policy in education as cited in Iyagbaye (2018), stated that the goals of technical education training include: to produce trained manpower in the applied sciences, technology and business specifically at craft, and technical level, Supply the technical knowledge and vocational skills necessary for agricultural, commercial and economic development as well as to train and impact the necessary skills to trainings of graduates that shall be self-reliant economically. For any country such as Nigeria to be economically viable, and strong in technological advancement, its technology education must be responsive to the above goals.

The responsiveness of technology education according to Ugwunali (2023) is the ability of technology education programms to adapt and align with the dynamic needs of society, industry, and the labour market. This implies that technology education programme must ensures that its curriculum, teaching methods, and resources are continuously updated to be at pal with emerging technologies, industrial trends, and the new skills required by students to thrive in the dynamic workforce after graduation.Technology education programmess are very important for instilling the skills required for employment and competitiveness in the global economy. However, studies such as that of Okwu (2023), Okoye and Maxwell (2016) has shown that technology education programmes in Rivers State and Nigeria in general are faced with challenges. Among the challenges is the lack of adequate strategies that can keep graduates up to date with emerging trends and advancing technologies in existing field. The implication of the above challenge is that, technology education graduates will in time not be able to compete favorably with the labour market due to obsolete skills possessed by the graduates. To keep a technology education graduate up to date with emerging technologies and advancement in innovation, lifelong learning is necessary. Therefor technology education graduates must continue to educate themselves with the modem tools, equipment and methods through lifelong learning programmes provided by technology education either in organized school environment or at industrial level to better face the labour market dynamics in Nigeria.

Labour market according to Will (2024) is the supply of and demands for labour, also known as the job market, it's based on employees providing the supply and employers providing the demand. It's a major component of any economy and it's intricately linked to markets for capital, goods, and services. The key elements of a lebour market includes; supply and demand for labour, employees provide the supply and employers provide the demand, the labour market is viewed at macroeconomic and microeconomic levels because each offers valuable insight into employment and the economy as a whole, unemployment rates and labour productivity rates are two important macroeconomic gauges, individual wages and the number of hours worked in an hourly wage job are two important microeconomic gauges. The Nigerian labor market is characterized by a high level of informal employment, a large youth population with significant unemployment, a gender gap in participation, and a heavy reliance on the private sector, particularly for younger workers, with most employment concentrated in agriculture and small-scale businesses; despite a relatively high labour force participation rate, the quality of jobs remains a major concern, with a significant portion of the workforce underemployed or engaged in precarious work (National Bureau of statistics, 2023). Presently the labour market in Nigeria is faced with changes due to technological advancement, therefore requires lifelong learning strategies for its workers to remain relevant in their various field.

Lifelong learning, according to Alison (2024), refers to the process whereby a person is continuously up-skilling, reskilling and uncovering new career and personal growth pathways throughout their lifetime. Lifelong learners are those who actively and intentionally engage in activities designed to build their skillset in some way, as part of an ongoing, long term process of self-improvement. The key is that the chosen learning is voluntary and led by that individual they choose what they want to learn, when and how, and whether they undertake it for personal fulfillment or to support their professional development. Merriam and Caffarella (1999) described lifelong learning as "a dynamic process that occurs throughout an individual's life, driven by personal interests, professional needs, and societal changes, encompassing formal, non-formal, and informal learning contexts." It encompasses formal, non-formal, and informal learning opportunities, enabling individuals to adapt to evolving social, economic, and technological changes. Lifelong learning fosters active citizenship, employability, and personal fulfillment by emphasizing the continuous development of competencies across various contexts.

Since Technology education programmes in Rivers State face challenges, of lack of adequate strategies that can keep graduate up to date with emerging trends and advancing technologies in existing field, up-skilling opportunities, industrial partnerships, digital literacy and emerging technologies, which can be summed up as lifelong learning has become a missing link in responsiveness of technology education program in Rivers State (Besim 2024; Assefa 2024; Kajal, 2024).

Up-skilling according to Bolatito and Adekomaya, (2023), is the process of acquiring new skills to enhance existing competencies, also the process of enhancing and updating individuals' existing skills to meet the evolving demands of technological advancements; this involves continuous learning and development to stay current with emerging tools and methodologies. World Bank (2022) also states that "up-skilling in technology education involves equipping learners with higher-level digital competencies, including artificial intelligence (AI), cloud computing, and cyber security, to improve workforce competitiveness in the fourth industrial revolution. As a lifelong learning strategy, up-skilling is crucial in technology education, where advancements such as Artificial Intelligence (IA), automation, and data analytics are reshaping industries. By fostering continuous skill development, up-skilling equips individuals to meet the demands of the labour market and adapt to new technologies (Sukarna & Nanvadee, 2020). In the context of technology education, up-skilling involves providing targeted training in emerging technologies, integrating digital literacy into curricula, and offering modular courses or certifications that align with industry needs. For example, short-term programs in software development, cyber security, or renewable energy technologies can bridge skill gaps and enhance employability. This approach benefits not only individuals but also organizations, as a skilled workforce drives innovation and productivity (Organization for Economic Co-operation and Development, 2019).Up-skilling as a lifelong learning strategy aligns with the broader goal of technology education: to create a technologically literate society capable of addressing contemporary challenges and leveraging opportunities in the digital age.

Industrial-acdemia Partnership in the other hand, according to Wicky, (2024), is the collaboration between educational institutions and industries to bridge the gap between academic learning and industry requirements, with the primary objectives of ensuring that educational programmes are aligned with industry needs, provide students with real world experiences, and facilitate seamless transitions from education to employment. Additionally, Olufunke, et al (2024) define this partnership as a strategic alliance between academia and industries to co-develop educational programmes, conduct applied research, and create pathways for students and professionals to acquire hands-on experience with emerging technologies. These partnerships foster joint research, innovation, skills development, and knowledge exchange, ensuring academic curricula align with industry needs and providing opportunities for students to gain real-world experience.

As a lifelong learning strategy in technology education, these partnerships facilitate the development of relevant skills, foster innovation, and ensure that graduates are prepared to meet the evolving demands of

the labour market. Key initiatives under industrial-academia partnerships include internships, cooperative education programs, joint research projects, and curriculum co-design. These initiatives allow students to gain hands-on experience with emerging technologies and industry practices. Additionally, lifelong learning programs such as on-the-job training and skill-upgrading workshops offered in collaboration with industry partners provide opportunities for professionals to stay relevant in their careers (World Economic Forum, 2020). Industrial-academia partnerships also benefit industries by providing access to a pipeline of well-trained talent workforce and fostering innovation through collaborative research. This mutually beneficial relationship underscores the importance of integrating lifelong learning into technology education to build a resilient, skilled workforce.

Statement of Problem

Despite government efforts to revamp education through various initiatives, the responsiveness of technology education programmes in Rivers State remains limited. These programmes often fail to align with the fast-paced evolution of industry needs, leaving graduates underprepared for current labour market demands (Okoye and Maxwell, 2016). Moreover, a lack of emphasis on lifelong learning strategies has exacerbated skills mismatches, contributing to rising unemployment and underemployment rates. Consequently, this ugly situation has led to joblessness in the part of technology education graduates as well as not being at pal with modern technologies and methods. It is this premises this study explored effective lifelong learning strategies that enhances the responsiveness of technology education programs in Rivers State. The aims is to provide actionable insights for policymakers, educators, and industry stakeholders to create a more robust and agile educational system capable of driving economic growth and individual empowerment.

Purpose of the Study

The main purpose of the study is to examine lifelong learning strategies for enhancing the responsiveness of technology education programs for labour market dynamic in Rivers state. Specifically, the study determined;

1 The extent to which up-skilling enhances the responsiveness of technology education for labour market dynamic in Rivers State.
2 The extent to which industrial-academia partnership enhances the responsiveness of technology education for labour market dynamic in Rivers State.

Research Question

1. To what extent does up-skilling enhance the responsiveness of technology education for labour market dynamic in Rivers State?
2. To what extent does industrial-academia partnership enhance the responsiveness of technology education for labour market dynamic in Rivers State.

Hypotheses

Ho1: There is no significance difference in the mean response of technology education graduates and their employers on the extent to which up-skilling enhance the responsiveness of technology education for labour market dynamic in Rivers State.

Ho2: There is no significance difference in the mean response of technology education graduates and their employers on the extent to which industrial-academia Partnership enhance the responsiveness of technology education for labour market dynamic in Rivers State.

METHODOLOGY

The study was conducted in Rivers State Nigeria. A descriptive survey research design was adopted for the study. Descriptive design was considered appropriate for conducting this study since the study was designed to elicit information from technology education graduates and their employers using a structured questionnaire. The population for the study included 20 technology education graduates and 10 employers of technology education graduates in Rivers State. Census sampling was used since the population was manageable. A

structured questionnaire titled "Lifelong Learning Strategies for Enhancing the Responsiveness of Technology Education Questionnaire" (LLSERTEQ) was used. The questionnaire was structured based on the research questions that guided the study. The questionnaire had two sections, A and B. Section A, contained personal data of the respondents. Section B contained 20 items in two clusters of B1 and B2, in accordance with the research questions. The instrument was structured on a five point scale of Very High Extent (VHE); High Extent (HE); Moderate Extent (ME); Low Extent (LE); and Very Low Extent (VLE) with nominal values of 5, 4, 3, 2, and 1 respectively assigned. The face validity of the instrument was conducted using the opinions of three experts. To establish the internal consistency of the items in the instrument, a pilot test was conducted using 15 technology education graduates and 5 employers of technology education graduates in Delta State which was not part of the study area but share similar characteristics with Rivers State. Cronbach Alpha was used to analyze the data to establish the internal consistency of the instrument. The researcher personally administered copies of the instrument. A period of 1 week was used for the distribution and collection of the instrument. In answering the research questions, descriptive statistics of mean and standard deviation was used to analyze the data collected for the study while t- test was used to test the hypotheses at 0.05 level of significance. In the analysis of the items in the instrument, any item with mean of 2.50 and above was accepted as high extent, while any item with 2.49 and below was considered as low extent. In testing the null hypotheses, when the calculated value (t-cal) is less than the table value (t- critical), the null hypotheses was accepted, but when the calculated value (t-cal) is greater than or equal to the table value (t-critical), the null hypothesis was rejected. The analysis was done with the application of a computer software programme called Statistical Package for Social Sciences (SPSS) version 20.

RESULTS

Research Question 1: *To what extent does up-skilling enhance the responsiveness of technology education for labour market dynamic in Rivers State?*

Table 1: Mean and Standard Deviation on extent to which Up-skilling enhanced the responsiveness of Technology Education for Labour Market dynamic in Rivers State.

SN	ITEMS	GRADUATES (N=20)			EMPLOYERS (N=10)		
		$\bar{X}$	SD	REMARK	$\bar{X}$	SD	REMARK
1	Workshops has improved my technical skills	3.63	0.83	HE	3.50	0.85	HE
2	On the job training has enhanced my skills in machine operation.	4.05	0.84	HE	4.30	0.48	HE
3	Professional certification courses has broaden my understanding on modern methods	4.05	0.97	HE	4.10	0.99	HE
4	Soft skill training helped me to improve my skills in equipment management.	3.58	0.50	HE	3.50	0.52	HE
5	Training on a specific equipment and products helped me to cope with new technologies	4.42	0.60	HE	3.90	0.73	HE
6	Industrial training helped me to operate automated equipment efficiently.	4.53	0.61	VHE	4.50	0.70	VHE
7	Advanced technical skills and specialized programs has improved my operational techniques	3.95	0.22	HE	3.80	0.42	HE
8	Utilization of online learning platforms has broadened my understanding of modern operational methods of tools and equipment.	4.16	1.16	HE	4.20	1.22	HE
9	Apprenticeship programs have helped me to match theory to practical.	4.26	0.87	HE	4.50	0.85	VHE
10	Mentorship and coaching programs has helped me to develop more skills on the use of modern tools and equipment.	4.26	0.87	HE	4.80	0.42	VHE
	Grand total	**4.08**	**0.30**	**HE**	**4.11**	**0.32**	**HE**

$\bar{X} = Mean,\ \ SD = Standard\ Deviation$

The data presented in table 1 indicates that, respondents have aggregate mean values ranging from 3.50 to 4.80 and a grand mean of 4.09; aggregate standard deviation values ranging from 0.22 to 1.22 and grand standard deviation of 0.31. This indicates that respondents are homogeneous in their responses. Their responses on extent to which up-skilling enhance the responsiveness of technology education for labour market dynamic in Rivers State indicates that; in group one, item 6 show that up-skilling, to a very high extent enhanced the responsiveness of technology education program because it has individual mean of 4.53; while item 1,2,3,4,5,7, 8,9 and 10 shows that to a high extent, up-skilling programs enhanced the responsiveness of technology education programmes for labour market dynamics in Rivers State. In group two; item 6, 9 and 10 show that up-skilling, to a very high extent enhanced the responsiveness of technology education program because they had individual mean of 4.50,4.50 and 4.80 respectively; while item 1,2,3,4,5,7, and 8 shows that to a high extent, up-skilling programmes enhanced the responsiveness of technology education programmes for labour market dynamics in Rivers State.

Research Question 2: *To what extent does industrial-academia partnership enhance the responsiveness of technology education for labor market dynamic in Rivers State?*

Table 2: Mean and Standard Deviation on the extent to which Industrial-Academia Partnership enhanced the responsiveness of Technology Education for Labour Market dynamic in Rivers State.

SN	ITEMS	GRADUATES (N=20)			EMPLOYERS (N=10)		
		$\bar{X}$	SD	REMARK	$\bar{X}$	SD	REMARK
21	Internship and apprenticeship made me to develop skills in practical application.	4.21	0.71	HE	4.00	0.67	HE
22	Workshops and seminars has enhanced my understanding of modern tool, equipment and methods,	4.21	0.78	HE	4.30	0.82	HE
23	Research and collaborations has enhanced my research skills and teamwork.	3.74	0.73	HE	3.70	0.67	HE
24	Industry/academic guest lecturer has enhanced my understanding of modern ways of operation in the workshop.	4.21	0.63	HE	4.50	0.52	VHE
25	Scholarships and grants has made it easier to study more on new equipment, tools and methods	3.68	0.82	HE	3.70	0.82	HE
26	Job placement assistance has helped me to secure a job after graduation.	3.95	0.97	HE	4.30	0.82	HE
27	Training and certifications has enhanced my skills on new equipment, tools and methods.	4.00	0.88	HE	4.20	0.78	HE
28	Mentorship programmes helped me to develop more skills on operating new equipment.	4.05	0.97	HE	4.20	0.78	HE
29	Technology transfer programmes has helped acquire more skills from experts.	3.84	0.89	HE	3.90	0.87	HE
30	SIWES programmes have helped me to put in practice what I was taught in the class.	4.11	0.65	HE	3.80	0.63	HE
	Grand total	**4.00**	**0.21**	**HE**	**4.06**	**0.32**	**HE**

$\bar{X} = Mean, \quad SD = Standard\ Deviation$

The data presented in table 2 indicates that, respondents have aggregate mean values ranging from 3.68 to 4.50 and a grand mean of 4.03; aggregate standard deviation values ranging from 0.52 to 0.97 and grand standard deviation of 0.27. This indicates that respondents are homogeneous in their responses. Their responses on extent to which industrial-academia partnership enhanced the responsiveness of technology

education for labour market dynamics in Rivers State indicates that; in group one, item 21-30 show that industrial-academia partnership, to a high extent enhanced the responsiveness of technology education programmes for labour market dynamics in Rivers State. In group two; item 24, show that industrial-academia partnership, to a very high extent enhanced the responsiveness of technology education program because it had individual mean of 4.50, while item 21,22,23,25,26,27,28,29 and 30 shows that to a high extent, industrial-academia Partnership enhanced the responsiveness of technology education programmes for labour market dynamics in Rivers State.

Hypotheses Testing

Hypothesis 1: There is no significance difference in the mean response of technology education graduates and their employers on the extent to which up-skilling enhance the responsiveness of technology education for labor market dynamic in Rivers State.

Table 3: Summary of Results of Testing Null Hypothesis 1 with t-test Statistics

Group	N	$\bar{X}$	SD	Df	t-cal	t-crit	Decision	Remark
Graduates	20	4.08	0.30	28	0.17	1.70	Accepted	No
Employers	10	4.11	0.32					significance

The result in table 3 shows that t-cal is 0.17 and t-cri is 1.70 at 0.05 significant level. This indicates that t-cal (0.17) is less than t-cri (1.70). As a result, the stated null hypothesis that, there is no significance difference in the mean response of technology education graduates and their employers on the extent to which up-skilling enhanced the responsiveness of technology education for labour market dynamic in Rivers State was accepted at 0.05 level of significant.

Hypothesis 2: There is no significance difference in the mean response of technology education graduates and their employers on the extent to which Industrial-Academia Partnership enhance the responsiveness of technology education for labor market dynamic in Rivers State.

Table 5: Summary of Results of Testing Null Hypothesis 3 with t-test Statistics

Group	N	$\bar{X}$	SD	Df	t-cal	t-crit	Decision	Remark
Graduates	20	4.00	0.21	28	0.53	1.70	Accepted	No
Employers	10	4.06	0.32					significance

The result in table 5 shows that t-cal is 0.53 and t-cri is 1.70 at 0.05 significant level. This indicates that t-cal (0.53) is less than t-cri (1.70). As a result, the stated null hypothesis that, there is no significance difference in the mean response of technology education graduates and their employers on the extent to which industrial-academia partnership enhanced the responsiveness of technology education for labor market dynamic in Rivers State was accepted at 0.05 level of significant.

DISCUSSION OF FINDINGS

Table 1 shows that up-skilling as a lifelong learning strategy with other sub programmes such as: Workshops and seminars, on the job technical and vocational training, professional certification courses, soft skilling training on specific equipment and product, digital and basic IT training, advanced technical skills and specialized programmes, utilization of online learning platforms, apprenticeship and internship programmes influenced the responsiveness of technology education to a high extent. These are in conformity with the Organization for Economic Co-operation and Development (2019) which stated that in the context of technology education, up-skilling involves providing targeted training in emerging technologies, integrating digital literacy into curricula, and offering modular courses or certifications that align with industry needs, This approach benefits not only individuals but also organizations, as a skilled workforce drives innovation and productivity. The study of organization for economic co-operation and development highlighted the benefits of up-skilling programs while the present study x-rayed how these

programmes influenced the responsiveness of technology education programmes thereby bridging the gap that exist between the production of skill workforce and remaining relevant in the dynamism of the country workforce due to innovations and technological advancement

Table 2 shows that industrial-academia partnership as a lifelong learning strategy with other sub programmes such as; Internship and apprenticeship, workshop and seminars, research and collaborations, industry-academic guest lectures, scholarship and grants, job placement assistance, training and certifications, technology transfer programs and SIWES programmes influenced the responsiveness of technology education to a high extent. These findings are in line with World Economic Forum, (2020) which stated that lifelong learning programs such as on-the-job training and skill-upgrading workshops offered in collaboration with industry partners provide opportunities for professionals to stay relevant in their careers. By combining theoretical knowledge with practical application, such collaborations create a dynamic learning environment that supports continuous professional growth. This study highlighted the benefits of digital literacy and emerging technologies programs while the present study x-rayed how these programmes influenced the responsiveness of technology education programmes thereby bridging the gap that exist between the production of skill workforce and remaining relevance in the dynamism of the country workforce due to innovations and technological advancement. This study equally revealed that; there was no significance difference in the mean response of technology education graduates and their employers on the extent to which up-skilling enhanced the responsiveness of technology education for labour market dynamic in Rivers State also, There was no significance difference in the mean response of technology education graduates and their employers on the extent to which digital literacy and emerging technologies enhanced the responsiveness of technology education for labour market dynamic in Rivers State and finally, There was no significance difference in the mean response of technology education graduates and their employers on the extent to which industrial-academia partnership enhanced the responsiveness of technology education for labor market dynamic in Rivers State.

CONCLUSION

Based on the findings of the study, lifelong learning strategies such as up-skilling programs, and industrial-academia partnership programmes has a high influence on the responsiveness of technology education programmes. Therefore the curriculum of technology education should be designed in a way that it will accommodate lifelong learning if technical education graduates must continue to remain relevance in their place of work following the labour market dynamics as a result of innovations in machines, tools, equipment and methods in the industries.

RECOMMENDATIONS

Based on the findings of the study, the following recommendation was made:

1. Technology education institutions should collaborate with industry experts to design and implement regular up-skilling programs that address current and emerging industry needs. Educational policymakers and institutions should prioritize the inclusion of advanced digital literacy modules in technology education curricula that will equip students with the skills that will align their competencies with global technological advancements and labour market demands.
2. Institutions should establish strong partnerships with industries to ensure curriculum relevance, provide students with practical exposure through internships, and facilitate knowledge transfer. Educators in technology education programs should undergo regular professional development to stay abreast of labour market trends and technological advancements.

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