

Building Skilled and Productive 21st Century Society in An Era of Economic Uncertainties through Technical Education Programmes in Rivers State

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Abstract

The study looked into building a skilled and productive 21st century society in an era of economic uncertainties through technical education programmes in Rivers State. It investigated building technology education skill for a productive 21st century society in Rivers State, electrical/electronic skills for a productive 21st century society in Rivers State, and mechanical/metalwork technology education skills for a productive 21st century society in Rivers State. Three research questions and hypotheses were answered and tested at 0.05 level of significance. A descriptive survey design guided the study. The population of the study comprised 61 and 87 technical education lecturers and years' three students respectively in the three tertiary institutions in Rivers State that offers this programme. The population was manageable, therefore, the entire population were sampled. Self-made survey questionnaire served as the instrument for the study. The instrument was validated by three experts in the fields. Reliability of the instrument was established using Cronbach Alpha reliability coefficient which yielded a coefficient of 74. Mean and Standard Deviation were used to answer the research questions while z-test statistical tool was used to test the hypotheses. The study found among others that site design, interpretation of architectural drawing, ICT application, power system, programming, electrical measurement and instrumentation, electrical machine maintenance, automobile engine molding, accurate use of hydraulic press, machine processing, operation of computer numerical control machines are skills for building a productive 21st century society in River State . It was recommended among others that universities and government should provide for the programmes 21st century equipment as well train staff on the relevant areas.

Keyword: Skill, Productive, 21st Century Society, Economic Uncertainty, Technical Education Programmes

INTRODUCTION

It has long been recognized that education and skills are important drivers of economic growth and productivity. Higher levels of educational attainment and skill raise productivity directly by expanding an individual's economic capabilities, enabling them to accomplish more difficult tasks and to address more complex problems. But education and skills are also argued to raise productivity through indirect mechanisms, facilitating technological diffusion and innovation which may enable a society to move to a higher growth path. One of the major factors that can bring about building a skilled and productive society of any nation is a functional human capacity. Building a functional human capacity involves education and training designed to provide the individuals with knowledge, skills and attitudes related to occupations in various sectors of economic and social life and productivity.

Skilled is the ability to do something well, usually gained through training or experience that is needed, Ogundele (2019). Skills and Productivity is a key factor driving long term economic growth and increases in living standards. Productivity also affects business cycle developments, inflation, exchange rates and other key macroeconomic variables, such as consumption, investment and employment, Muhammad, Fozia, Afsheen, & Miftikhar-ul. (2019). They added that, In terms of labour market, productivity growth is essential for creating quality jobs, since increased labour productivity can lead to higher wages, better working conditions, and more investment in human resources. It therefore provides a sustainable route out of poverty

Technical education is a branch of education that is concerned with the development of competent worker in terms of acquisition of adequate knowledge and technical skills (Ajie, Iyagbaye & Bassey, 2024) Technical education programmes are course or areas of study in tertiary institutions which has been identified as one of the effective human resource development that needs to be embraced for rapid industrialization and sustainable technological development of any society. Technical education has been an integral part of national development in many societies because of its impact on productivity and economic development. Odo, Okafor, Odo, Ejikeugwu, & Ugwuoke (2017). Ogundele (2019) view technical education as “the aspect of learning which involves special manipulative skills, creative minds, and attitudes required to practice a profession (occupation) for the benefit of that individual and the society. In line with this, Okoye & Arimonu (2016) stated that technical education, as enshrined in the Nigerian national policy on education, is concerned with qualitative technological human resources development directed towards a national pool of skilled and self-reliant craftsmen, technicians and technologists in technical and vocational education fields, it provides general technical knowledge. Again, technical education contributes so much ranging from electrical and electronics technology, metalwork and mechanical technology, building and woodwork technology etc, technical education is practical oriented education which makes it unique in its content and approach.

According to Abel (2021), building and woodwork technology graduates are taught to work effectively with materials, tools, sensitive equipment and machines to mould blocks, carry out preliminary site operations, concreting, block wall construction and finishing in the building industry, furniture etc. In line with this, Aliozor in Abel (2021) stated that building technology in the age (21st century) as a course comprises of different components or operations which require skills to perform them. These components include designing of building plans using auto-cards,

setting out of the building, block work on the concrete foundation, leveling of the building, roofing pattern, plastering and rendering of walls (screed walls, archi cad, autocad, 3d max etc.

Electrical and Electronic education is among the skilled areas studied in technical education programmes. The program is aim at producing technicians and other skilled personnel who will be enterprising and self-reliant with skills in domestic and industrial, installations, as well as operate, maintain and repair electrical and electronic equipment, among others, more so, contribute to making a nation a productive society. Agbo (2023) posited that some of the electrical/electronic skills possessed by theses graduates among others include, programming skills talking about proficiency in language like python, C++, and MATLAB; artificial intelligence and machine learning; circuit analysis, power system, control system, simulation and modeling, electrical installation.

Mechanical and metalwork technology is one of the field areas that its activities focuses on making object or articles out of metal, maintenance and repairs of auto parts, engine and sensitive tool machine operation. Danjuma & Umar in Lappi & Onuh, (2021) It is generally called mechanical technology because it involves ways of making articles or product using different tools, equipment and machines (Beako, Okagwa and Wordu, 2019). Mechanical and metalwork technology has many branches such as, fittings, machining, fabrication and welding, forging and foundry work, auto body productions, repairs and servicing. The purpose of metalwork technology is to equip students with basic skills in technology that can make them acquainted with the materials, tools, equipment and machines of mechanical and metalwork technology to produce articles of metals that will source income and means of self-enterprise after graduating from school. Therefore, graduates of mechanical and metalwork technology are expected to make use of hand tools as well as operate machine tools effectively for manufacturing articles or objects, also to carry out maintenance culture on engines, machine and hand tools.

Economic uncertainty refers to a situation in which the future economic environment is difficult to predict, and there is a high degree of risk or unknowns involved. This can be caused by a variety of factors, including political instability, changes in government, policies, natural disasters, and market fluctuations.

The 21st century society, according to Friedman in Oviawe, Uwameiye, & Uddin (2017) is a society that is dynamic with technological development and advancement. The rapid advancement in technological development has placed new demands for the 21st century workforce whose products of technical education are prepared to serve. The 21st century workforce is unique and only people with adequate skills can survive and progress smoothly. The unique characteristics of the 21st century according to Aguba in Iroriteraye-Adjekpovu (2016) includes: (i) a scientific and computer world; (ii) a technological or jet age demanding efficient use of computer in all spheres of life; (iii) an age requiring sound scientific and technological skills for individual to cope with its complexity; (iv) a world where emphasis will be more on accuracy, competence, efficiency, skilled and effectiveness which are derived from education; and (v) an era of highly skilled practitioners and generalists.

Skills and productivity is concerned with the exploitation of human and material resources, the direction of involvement, the orientation of technological development and institutional change

that are in harmony with, and enhance, both current and future potentials to meet human needs and aspirations in the 21st century world. In adding to this, Samuel and Kissi in Ogwa and Ndem (2017) posited that the people with requisite scientific and technical skills that can create wealth and help a country production level to attain economic prosperity should be trained through technical education. It is in line with this, that this research is meant to investigate building a skilled and proactive 21st century society through technical education programmes in tertiary institutions in Rivers State.

Problem of the Study

Education that produces skilled individual is important for every nation, it plays a vital role to change the start of a country. It makes a man realize about himself and his goals and how to achieve them. In this era of globalization also called 21st century, a country without technical and technological base will be turned into a dumping ground for imported goods. Balogun as cited in Ahante and Ademila (2014) states that the pressure on Nigeria is to source means as cheaply as possible to be able to remain competitive in a deregulated global economy, as the present reality of our economic problems has made the nation to focus attention on the role that skilled technical manpower can play in making Nigeria a productive society in this age. Technical education promotes the materials prosperity, productivity and economic advancement, self-respect and dignity. If a country has her own technical experts, she definitely will save a lot of foreign exchange. Technical education makes a country rich, prosperous and resourceful (Ajie, Osoh and Thomas, 2022). Technical education graduates are the only group of people within the tertiary educational system that are basically trained to be focused on production. It is in line with these that this study is out to look into building a skilled and productive 21st century society through technical education programmes in tertiary institutions in Rivers State.

Purpose of the study

The purpose of this study is focused on building a skilled and productive 21st century society through technical education programmes in tertiary institutions in Rivers State. Specifically, the study is meant to:

1. Investigate building technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State.
2. Ascertain electrical/electronic skills for a productive 21st century society in an era of economic uncertainties in Rivers State.
3. Investigate mechanical technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State.

Research Question.

The following research questions guided the study.

1. What are the building technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State?
2. What are the electrical/electronic education skills for a productive 21st century society in an era of economic uncertainties in Rivers State?

3. What are the mechanical technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State?

Hypothesis

The following hypothesis guided the study,

HO₁. There is no significant difference between the mean responses of technical education lecturers and students on building technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State.

HO₂. There is no significant difference between the mean responses of technical education lecturers and students on electrical/electronic technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State.

HO₃. There is no significant difference between the mean responses of technical education lecturers and students on building technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State .

Methodology

The study was carried out in Rivers State, in the three tertiary institutions that offer technical education programmes. These tertiary institutions are Rivers State University Port Harcourt, Ignatius Ajuru University of Education, Rumuolomini, Port Harcourt, and Federal College of Education (Technical) Omoku River State in affiliation with University of Nigeria Nsukka. The design of the study was a descriptive survey. The population of the study comprised of 61 technical education lecturers and 87 years three students in these tertiary institutions. From this population, all the Lecturers and students were sampled for the study using purposive random sampling technique. The study adopted a three sectioned survey questionnaire tagged “Building skilled and productive 21st century society through technical education programme in tertiary institutions in Rivers State” for the study. The instrument for data collection was face and content validated by three expert in the department of Industrial Technical Education in Ignatius Ajuru University of education Rumuolumini, Port-Harcourt.Rivers State The instrument was structured in a four point rating scale of strongly agree (SA), agree (A), disagree (D), and strongly disagree (SD). The reliability of the instrument was determined using Cronbach Alpha Reliability method, test after administering it to 12 technical education undergraduates and 8 lecturers as respondents in Niger Delta University, Bayelsa state who were not part of the study, the reliability coefficient achieved was 0.89. The researchers administered the questionnaires to the respondents directly and all the instrument were retrieved. Mean and Standard Deviation were used to answer the research questions while z-test statistical tool was used to test the hypotheses of the instrument. Mean value 2.50 was set as cut off point for mean less than 2.50 was rejected while mean value equal or greater than 2.50 was accepted.

Results and Conclusion

Research Question 1. What are the building technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State?

Table 1, means responses on building technology education skills for a productive society

n=87		Lecturers n= 61			Students,		
S/N	Items	\bar{x}_1	SD ₁	Decision	\bar{x}_2	SD ₂	Decision
1	Site design skills	3.4	.50	Agree	3.13	.97	Agree
2	Skills in using hydraulic automatic breakdown pile cap to facilitate placement of precast capping beams	3.2	.55	Agree	2.85	.90	Agree
3	Skill in comparative analysis of historic projects	3.3	.72	Agree	3.13	.55	Agree
4	Interpretation of architectural drawing	3.3	.47	Agree	3.13	.61	Agree
5	Skills to Work with crane machine in the cause of operation	3.0	.50	Agree	3.08	.57	Agree
6	Skills to use theodolite instrument to check for square of walls angle accurately	3.3	.47	Agree	2.79	1.0	Agree
7	Skill to operate slab profiling tool	3.6	.48	Agree	3.35	.57	Agree
8	Skills to operate block cutting power tool effectively	3.4	.50	Agree	3.22	.42	Agree
9	Skills on health, safety, & welfare in the built environment	3.4	.50	Agree	3.04	.58	Agree
10	ICT application skills	3.6	.47	Agree	2.88	.85	Agree
11	Skills to erect expanded polystyrene wall panel supported with wire mesh	3.1	.66	Agree	3.16	.52	Agree
12	Skills to construct vinyl walls where additional protection is required	3.2	.52	Agree	2.79	.94	Agree
13	Skills on Archi-cad, Auto-cad, & 3d max	2.8	.98	Agree	2.87	.78	Agree
Total		3.3	.56	Agree	3.03	.71	Agree

Source. Field survey, 2024

Table 1: on the building technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State, shows that lecturers and students agreed that all the items posted above, are building technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State. This is based on the grand mean score of 3.38 and 3.03 respectively which is above 2.50 that was earlier stated as the acceptable means. Furthermore, the closeness in the standard deviation for the two groups which is .56 and .71 shows homogeneity in their responses.

Research Question 2. What are the electrical/electronic technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State?

Table 2, means responses on electrical/electronic technology education skills for a productive society

S/N	Items	Lecturers n=61			Students n=87		
		\bar{x}_1	SD ₁	Decision	\bar{x}_2	SD ₂	Decision
1	Power system	3.50	.50	Agree	3.31	1.01	Agree
2	Circuit design & analytical skills	3.50	.50	Agree	3.06	.54	Agree
3	C++ & Programming skill	3.51	.50	Agree	3.07	.48	Agree
4	Electrical circuit & data analysis	3.17	.49	Agree	3.27	.82	Agree
5	Internet of things (IoT)	2.74	1.10	Agree	2.97	.77	Agree
6	Cyber security, & signal processing	3.03	.57	Agree	2.86	.81	Agree
7	Power system project management skills	2.79	.85	Agree	3.12	.62	Agree
8	Schematic Capture skill	3.22	.42	Agree	3.09	.41	Agree
9	Electrical drafting	3.80	.39	Agree	3.05	.46	Agree
10	Electrical installations	3.16	.60	Agree	3.00	.56	Agree
11	Reading and understanding blueprint	3.11	.60	Agree	3.01	.53	Agree
12	Electrical embedded system skills	2.70	.77	Agree	3.12	.52	Agree
13	Electronic system simulation	3.25	.51	Agree	3.01	.51	Agree
14	Electrical measurement, calibration and instrumentation skills	3.56	.49	Agree	2.81	.82	Agree
15	Electrical machines & equipment servicing skills	3.17	.52	Agree	3.06	.52	Agree
Total		3.21	.55	Agree	3.05	.62	Agree

Source. Field survey, 2024

Table 2, on the electrical/electronic technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State, shows that lecturers and students agreed that all the items posted above, are electrical/electronic technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State. This is based on the grand mean score of 3.21 and 3.05 respectively which is above 2.50 that was earlier stated as the acceptable means. Furthermore, the closeness in the standard deviation for the two groups which is .55 and .62 shows homogeneity in their responses.

Research Question 3. What are the mechanical technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State?

Table 3, means responses on mechanical technology education skills for a productive society

S/N	Items	Lecturers n=61			Students n=87		
		\bar{x}_1	SD ₁	Decision	\bar{x}_2	SD ₂	Decision
1	Skills in diagnosing leakage in gas welding equipment using computer	3.3 0	.87	Agree	3.0 6	.56	Agree
2	Skills on quality check & quality control procedures	3.3 2	.47	Agree	3.2 1	.55	Agree
3	Skills to operate computer numerical control machines	2.7 9	.41	Agree	3.4 4	.50	Agree
4	Skills on the accurate use of hydraulic press	3.2 2	.55	Agree	3.3 2	.47	Agree
5	Read & interpret blue print accurately	3.0 6	.56	Agree	3.2 2	.52	Agree
6	Skills on machining processing, i.e, turning, boring, knurling etc	3.1 4	.59	Agree	2.8 2	.98	Agree
7	Skills on casting into any shape	3.3 2	.62	Agree	3.0 4	.96	Agree
8	Skills on computer operation	2.6 9	.96	Agree	3.1 6	.52	Agree
9	Scaffolding	3.6 9	.46	Agree	2.7 9	.94	Agree
10	Machine maintenance	2.9 8	.58	Agree	3.1 3	.97	Agree
11	Auto-body construction/repair	3.0 9	.39	Agree	3.1 2	.42	Agree
12	Automobile engine molding	3.1 9	.46	Agree	3.0 8	.57	Agree
13	Automobile electrical skills	2.5 9	.96	Agree	3.5 0	.50	Agree
14	Structural, argon, arc, & oxyacetylene welding skills	3,1 4	.53	Agree	3.1 7	.49	Agree

15	Material procurement skills	2.5 9	1.0 6	Agree	3.0 3	.57	Agree
Total		3.0 0	.63	Agree	3.1 3	.53	Agree

Source. Field survey, 2024

Table 3, on the mechanical technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State, shows that lecturers and students agreed that all the items posted above, are mechanical technology education skills for a productive 21st century society in an era of economic uncertainties in Rivers State. This is based on the grand mean score of 3.00 and 3.15 respectively which is above 2.50 that was earlier stated as the acceptable means. Furthermore, the closeness in the standard deviation for the two groups which is .63 and .53 shows homogeneity in their responses.

Hypothesis 1: There is no significant difference between the mean responses of technical education lecturers and students on building technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State.

Table 1, z-text analysis on building technology education skills for a productive 21st century society

Category	N	X	SD	DF	z-cal.	z-crit.	Remark
Lecturers	61	3.38	.56	146	3.35	1.96	Significance
Students	87	3.03	.71				

Source, field survey 2024.

Data in table 1 above reveal that z-calculated (3.35) is greater than z-critical (1.96) at 0.05 level of significance. Therefore, the null hypothesis was rejected. Hence, there is a significant difference between the mean responses of technical education lecturers and students on building technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State.

Hypothesis 2: There is no significant difference between the mean responses of technical education lecturers and students on electrical/electronic technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State.

Table 2, z-text analysis on electrical/electronic technology education skills for a productive 21st century society

Category	N	X	SD	DF	z-cal.	z-crit.	Remark
Lecturers	61	3.21	.55	146	1.65	1.96	Not Significance
Students	87	3.05	.62				

Source, field survey 2024.

Data in table 2 above reveal that z-calculated (1.65) is not greater than z-critical (1.96) at 0.05 level of significance. Therefore, the null hypothesis was accepted. Hence, there is no significant

difference between the mean responses of technical education lecturers and final year students on electrical/electronic technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State.

Hypothesis 3. There is no significant difference between the mean responses of technical education lecturers and students on mechanical technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State.

Table 3, z-text analysis on mechanical technology education skills for a productive 21st century society

Category	N	X	SD	DF	z-cal.	z-crit.	Remark
Lecturers	61	3.00	.63	146	1.32	1.96	Not Significance
Students	87	3.13	.53				

Source, field survey 2024.

Data in table 3 above reveal that z-calculated (1.32) is not greater than z-critical (1.98) at 0.05 level of significance. Therefore, the null hypothesis was accepted. Hence, there is no significant difference between the mean responses of technical education lecturers and final year students on mechanical technology education skill for a productive 21st century society in an era of economic uncertainties in Rivers State.

Conclusion

From the finding, it is deduced that building, electrical/electronic, as well as mechanical skills all in technical education programmes are essential skills in this age that can create a skilled and productive society in this era of economic uncertainties. In the other words, In the 21st century society, skills and Productivity is a key factor driving long term economic growth and increases in living standards. Productivity in this age affects business cycle developments, inflation, exchange rates and other key macroeconomic variables, such as consumption, investment and employment. Productivity growth is essential for creating quality jobs, since increased labour productivity can lead to higher wages, better working conditions, and more investment in human resources. It therefore provides a sustainable route out of poverty. Technical education programme haven been designed to build individuals in divers technical/productive skills, has a huge role to play in building a skilled and productive society, in that in a state of economic uncertainty it is skills and production than can liberate such nation

Recommendations

The following recommendations were made as it concern the study

1. Tertiary institutions and the Government should encourage staff (lecturers and instructors) to upgrade their practical knowledge by periodically sending them into the industry to get acquainted with the current requirements of the work environment and the skills needed in their fields of specialty for a productive society in this 21st century.

2. Focuses should be more in building skilled individual than certificate to be acquired by the students or trainees.
3. Technical education Teachers and instructor training institutions in Rivers state should focus on Competency areas to improve Skills for delivery that will enhance needed competencies for the upcoming teachers,

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