Students' Perception of Science Education as an Empowerment Tool in a Period of Insecurity and Economic Downturn in Nigeria

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Abstract

The purpose of this study was toexamine the students' perception towards scienceeducation as an empowerment tool in a period of insecurity and economic downturn in Nigeria. The study adopted a descriptive survey research design using secondary school students in public schools. The area of the study was Akwa Ibom State, Nigeria. The population of the study consisted of all the 12,880 senior secondary two (SS2) students in the Akwa Ibom State in 2023/2024 academic session. Two research questions were developed to guide the study. A sample ofone thousand, eight hundred and forty (1840) students were selected using simple random sampling techniques. For the purpose of this study, two researchers-made instruments were developed, validated and used for collecting data. The instruments used were: Questionnaire on Students' Perception about Science Education as Empowerment Tool (QSPTSEET, r=.87) and Questionnaire on Optimization of empowerment opportunity in Science Education (QOEOSE, r=.84).The reliability estimate of the instruments was established through the Cronbach Alpha reliability method. The data collected were analyzed using weighted mean, percentages, frequency count and standard deviation. The major findings revealed students do not have a good perception about science education. Also, the student's negative perception has limited their ability to utilize science education as empowerment tool in period of insecurity and economic downturn because the lack interest and cannot harness its economic potentials. It was recommended that education stakeholders should encourage students to pursue their desired educational programme and not to be manipulated to enroll in programme that they have no perception or interest. Also, the education system should be review to emphasize on critical thinking, digital literacy for global competitiveness along with vocational training to produce future generation that are self-reliant and can contribute to the socio-economic and growth and transformation.

Keywords: Perception, Science education, Empowerment, Insecurity, Economic downturn.

Introduction

Science education in every society underpins economic, technological and social-cultural development and sustainability. Science education is the study of interrelationship between science as a discipline and the application of educational principles to its understanding, teaching and learning. Science is the systematic process of using observation and experiment to obtain a verifiable knowledge about natural phenomenon and the machinery of that process of science is the scientific method which includes observations, formation of hypothesis, making prediction and experimental test. Through this process of science, the products such as facts, principles and theories are formulated and over time become laws that regulate human life. This law has metamorphosed into Physics, Mathematics, Biology and Chemistry discipline and there form the basis for industrialization, economy, manufacturing, technology, engineering which sustains the nation economy.Science is regarded as the engine that can drives the economy and the level of a country's advancement depends on the magnitude of investment and development in science education and technology. According to Aniwgwu (2018), Science education curriculum aims to help children develop basic scientific ideas and understanding about the biological and physical aspects of the world, and the processes through which they develop this knowledge and understanding. Therefore, the foundation of science education is crucial in shaping the trajectory of the nation's progress.

The world's economy, are driven by high level of science and technology. In Nigeria, science education is taught at secondary school education levels so that the citizens can cultivate scientific culture early in life because science education plays a vital role in the individual's live and national development. Science education is meant to improves on citizens' physical, social, moral, mental abilities and help them to contribute meaningfully in the society. Therefore, any country experiencing a devastating security and economic downturn could be as a result of under-development in science and technology education. In developed countries, scientific knowledge is used to provide solution to real life problems such as food scarcity, pollution, disease outbreak healthcare, global warming among others (Leo, Uko, Akpan and Ekong, 2024). It therefore becomes necessary to equip students with solid foundation in scientific concepts in other to have a breakthrough from this unfortunate situation in the country. Although, the Federal Government through the Ministry of Education is engaging events to encourages the citizens to harnessing the opportunity in science education and also contribute to solving the nation's economic, security and socio-economic problems. Some of the initiative include the partnership with leading institutions of learning, corporate bodies, academia and development organizations to build a large ecosystem of science-oriented citizens to promote students' interest and perceptionin science education. However, these efforts are not enough to tackle the issue of negative perception about science education among students. Olufin, Amos, Falemu and Akinwumi (2023) had asserted that, explored the transformative potential of science education as a catalyst for socio-economic development in Nigeria, and opined that science education is a tool for achieving socio-economic development.

Perception

Perception is a way one regards or understands a concept, think about something (Longman, 2021). Perception influences decision-making and interest by providing the subjective interpretation of reality that guides our choice and shape what is valued.Perception is a cognitive, emotional and action tendency to a behavioral intent. Cimer (2011) mentioned that there is a close relationship between students' perception of their classroom learning environment and their success. Thus, student's perception shaped by biases, experience and emotion, filter information affecting their options about event or circumstances. Interest further refines this process, as they direct students' attention to specific of their perceived reality. Students with the right perception towards learning are likely to utilize opportunities in that field of study and use that knowledge to empower themselves economically in the future.

Empowerment

An educated mind is empowered to think critically, solve problems and be self-reliant; thereby contributing to the development of the society. Oloyede (2010) explained that economic empowerment is a phenomenon which is focused on giving a disadvantage group of people the ability to improve their situation economically. Empowerment involves providing an individual with necessary opportunities that will make them to gain control over the changes in the society. For example, Nigeria has natural deposit of petroleum resources and other resources which are processed into finished goods through the instruments like refineries, steel plants, paper mills and chemical industries for making soaps, cosmetics, perfumes, plastics, glass, and pesticides. The fertilizer and petrochemical plants which have boosted agriculture and other sector of industrial activities are only made possible through science. In addition, science gives access to telephone and the world of information and communication technology (ICT). The development of organic components, drugs and medicines have help in producing large yielding agricultural products, and many more.Thess industryemployes millions of manpower, and provides socio-economic gains to individual and the nation. These groups of people who are

equipped with scientific skills will not be dependent of government for their needs and cannot pose security threats to the country because they were empowered.

Insecurity

Insecurity is antonym of security. It is a state where people have the feeling of self-doubt or feel vulnerable and susceptible to harm particularly for a sustained period. Achumba and Ighomereho (2013) noted that physical insecurity takes many forms such as economic insecurity, social insecurity. Insecurity in a community will leads to anxiety, stress or mental health issues; decrease sense of well-being or happiness; reduce trust in institutions; increased fear; decreased social cohesion or community engagement; economic instability or stagnation, human right violations or social injustices among students and even teachers. In regions were insecurity problem persists, students are completely destabilized and distracted from learning. The disruption in educational activities can result in many unfortunate situations like teacher layoff or shortage.

Economic Downturn

The economy of a nation is influence by the quality of science and technological development. Also, lack of integration between academia and industry limits the country's industrial advancement. Bakari (2021) stated that economic downturn is the decline in economic activities like reduction in gross domestic product (GDP), increasedin unemployment rate, food insecurity, reduced government revenue and high debt and deficits. Economic downturn usually results in business bankrupts and closures, underfunding of schools, job losses and layoffs and general disruption of socio-economic activities.

Statement of the Problem

Nigeria, even after 61 years since creation, is yet to meet up international standard in the education system. However, in examining the impediments of effective achievement of the goals of education in the country, researchers have over concentrated their concerns on the operation of the education system such as the national philosophy of education; education reforms and problem associated with their implementation, the professionalism of teachers, the pedagogy and school environment but pay little attention to student's perception and interest in the field of study at schools. Unfortunately, some students are being manipulated to undertake Science education as a course of study, even without having positive perception about science or education. This eventually reduces their interest to study and they end up concluding that Science education is difficult. More so, if those sets of students eventually graduate from the school, they will not be self-reliant and thereby become dependent on government for social, security and economic needs. This educational gap has stimulated researchers to investigate other ways to inspire learners in science education. It is against this background that it became necessary to examined on student's perception of science education as an empowerment tool in a period of insecurity and economic downturn. Two research questions were guided the process of this study.

Research Questions

1. What is the perception of students about science education as empowerment tool in a period of insecurity and economic downturn?

2. Does students' perception about science education supports the optimization of opportunity in science education as empowerment tool in a period of insecurity and economic downturn?

Methods

The study adopted a descriptive survey research design using secondary school students in public schools. The area of the study was Akwa Ibom State, Nigeria. The population of the study consists of all the 12,880 senior secondary two (SS2) students in the Akwa Ibom State in 2023/2024 academic session. Two research questions were developed to guide the study. A sample of one thousand, eight hundred and forty (1840) students was selected using simple random sampling techniques. Two researchers- made instruments were developed for the study. The instruments used were: Questionnaire on Students' Perception towards Science Education as Empowerment Tool (QSPTSEET, r = 0.87) and Questionnaire on Optimization of empowerment opportunity in Science Education (QOEOSE, r = 0.84). The instruments were developed by the researcher with two sections A and B. Section A collected personal data of the students while Section B deal with students' perception towards science education as empowerment tool and the optimization of empowerment opportunities in science education in a period of insecurity and economic downturn. The initial 30 and 25 items respectively were subjected to peer and expert review to ensure the face and content validity of the instrument as well as their appropriateness for the target respondents. For QSPTSEET, the test items were reduced from 30 to 11 and QOEOSE was reduced from 25 to 10 items. The items were constructed on a four-point likert scale and assigned weights as follows: For positive response: Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1. For negative response: Strongly Disagree (SD) = 4, Disagree (D) = 3, Agree (A) = 2 and Strongly Agree (SA) = 1.

The instruments were trial-tested on twenty students in the study area which were not part of the main study. A Cronbach alpha reliability coefficient value of 0.87 and 0.84 were obtained respectively for the two instruments. Each of the schools involved in the study was visited by the researcher and questionnaire administered by providing copies of the instrument to each of the students in secondary school two classes. Data collected were analyzed using weighted mean, percentage, frequency count and standard deviation. The research questions were answered using descriptive statistics of mean and standard deviation. Mean value below 2.50 indicated that students disagreed with the item on the questionnaire while mean value above 2.50 indicated students' agreement with the item.

Results

Research question one:

What is the perception of students about science education as empowerment tool in a period of insecurity and economic downturn?

Table 1: **Mean rating and Standard deviation of response on the perception of students about science education as empowerment tool in a period of insecurity and economic downturn.**

S/N	**Statement**	SA	A	D	SD	Mean	STD.D	Decision
1	I have passion for science education study	17 14.2%	11 9.2%	58 48.3%	34 28.3%	2.06	0.89	Rejected
2	I feel that I have more job opportunities when I study science education	24 20.0%	20 16.7%	33 27.5%	43 35.8%	2..21	0.14	Rejected

3	I have developed interest to invent new materials from the knowledge of science	15 12.5%	29 24.2%	46 38.3%	30 25.0%	2.24	0.89	Rejected
4	Science subjects are not difficult for me to understand	18 15.0%	31 25.8%	31 25.8%	40 33.3%	2.23	0.98	Rejected
5	I feel the knowledge in science can equip me with entrepreneurial skills	21 17.5%	28 23.3%	39 32.5%	32 26.7%	2.32	0.96	Rejected
6	I am confident discussing scientific concepts with my classmates	16 13.4%	24 20.0%	28 23.3%	52 43.3%	2.03	0.99	Rejected
7	I feel that science classes can help me in developing scientific skills such as experimenting, measuring.	32 26.7%	44 36.7%	28 23.3%	16 13.3%	2.77	0.91	Accepted
8	I feel that science education can only make me become a classroom teacher	28 23.3%	40 33.3%	24 20%	28 23.3%	2.57	0.10	Accepted
9	I feel that science classes can enhance my economic ideas	34 28.3%	26 21.7%	36 30.0%	24 20.0%	2.58	0.11	Accepted
10	I feel coordinated when I am in science classes	10 8.3%	14 17.1%	26 21.6%	70 53.0%	1.70	0.89	Rejected
11	I feel that graduates of science education can hold a leadership position in the country	15 12.6%	47 39.1%	40 33.3%	18 15.0%	2.49	0.82	Rejected
	Weighted Mean = 17.1							

Source: Field work, 2024

The data in Table 1 revealed the mean rating of responses on the perception of students about science education as economic empowerment tool in a period of insecurity and economic downturn.The result revealed that students accepted to items 7,8 and 9 as the mean scores for these items was above the criterion mean of 2.50. Students, also rejected items 1, 2, 3, 4, 5, 6, 10 and 11 with mean scores below the criterion mean of 2.50. This indicated that majority of students perceived that Science education cannot bring about economic empowerment.

Research Question two:

Does students' perception about science education supports the optimization of opportunity in science education as empowerment tool in a period of insecurity and economic downturn?

Table 2: **Mean rating and Standard deviation of response on the optimization of opportunity in science education as empowerment tool in a period of insecurity and economic downturn.**

S/N	Statement	SA	A	D	SD	Mean	STD.D	Decision
1	I believe science education is essential for my future success	13 10.8%	40 33.3%	50 41.7%	17 14.7%	2.29	0.78	Rejected
2	Learning science is interesting and enjoyable	20 16.6%	30 25.1%	50 41.7%	20 16.6%	2.24	0.87	Rejected
3	Science education helps me develop	29	45	30	16	2.73	0.89	Accepted

	problem-solving skills	24.1%	37.5%	25.1%	13.3%			
4	I feel motivated to learn science because it can improve my economic prospects	28 23.3%	22 18.3%	32 26.7%	38 31.7%	2.33	0.10	Rejected
5	Science education is relevant to real-life situations	27 22.5%	23 19.1%	25 20.8%	45 37.6%	2.27	0.10	Rejected
6	I am confident that science education will help me achieve my career goals	37 30.8%	25 20.8%	32 26.7%	26 21.7%	2.61	0.10	Accepted
7	Learning science is challenging, but it is worth the effort	33 27.7%	30 25.0%	22 18.3%	35 29.2%	2.51	0.10	Rejected
8	Science education can help me make informed decisions about my future	13 10.8%	18 15.0%	29 24.2%	60 50.0%	1.87	0.95	Rejected
9	I enjoy learning science because it helps me understand how things work	25 20.9%	20 16.6%	44 36.7%	31 25.8%	2.33	0.98	Rejected
10	Science education is a key factor in achieving economic stability	19 15.8%	18 15.0%	53 44.2%	30 25.0%	2.22	0.91	Rejected
	Weighted Mean = 2.35							

Source: Field work, 2024

The data in Table 2 revealed the mean rating of responses on the optimization of opportunity in science education as empowerment tool in a period of insecurity and economic downturn. The result shows that few students accepted items 14 and 17 while items 12,13,15,16,18,19,20 and 21 were rejected. However, the grand mean of 2.35 indicates that majority of students are not passionate to study Science education hence cannot optimize the economic in this field of study. Thus, student's interest in this study area is low and so they do not accept the idea that science education can be an economic empowerment tool in a period of insecurity and economic downturn.

Discussion of Findings

The findings of this study revealed that some students agree that Science education can equipped them with scientific skills as indicated with mean of (2.77); and Science education can help them become classroom teachers with mean of (2.57). Most of the students disagree that Science education can give them economic ideas (2.58). However, majority of the student's responses was on disagreement as they showed lack of passion for science education as reflected in their mean scores of (2.06). The results indicated that the mean response on students' interest to invent new material from scientific knowledge was (2.24) and the result indicated that students perceived Science subject as being difficult with mean of (2.23). The mean response of students who feel that Science education can provide them entrepreneurial skills was (2.32). Most of the students also disagree about having confidence in discussing science with peers with (2.03) mean. The result indicated that majority of the students do not feel coordinated in science classes with mean response of (1.70) and students perceived that graduate of science education, may not gain social status in society with (2.49) in mean.

Eze (2018) opined that science teachers face numerous challenges, including inadequate resources, poor infrastructure, and lack of motivation due to insecurity and economic downturn. This causes low motivation for the student from inception of the programme and they cannot give out their best. Therefore, the pedagogy of teaching should

be made to stimulate students' interest in science education. This finding lean support to the study by Leo, Uko, Akpan and Ekong (2024) who stated that poor performance in academics is a result of use of obsolete instructional materials and teachingstrategyfor science curricular in most secondary schools are still delivered in primitive ways. This trend has contributed to the negative perception of science education among secondary school students. The devastating economic has also cause students to stay back from classes, some of the students have drop out. Other societal problems such as poor education funding, insecurity; attacks on schools and students by militant and herdsmen, destruction of educational infrastructure also contribute to the negative perception toward science education. Adenuga, (2023) asserted that a strike action in the heart of educational system jeopardize the future of youth and undermining the foundational pillars of societal progress, resulting in closure of numerous schools across swathes of Nigeria.

The findings revealed that most students disagree about science education as being essential for future success with mean of (2.29). Majority of the students rejected the idea that science education is an interesting and enjoyable course with mean of (2.24), while students agreed that problem-solving skills can be gained through science education with mean of (2.73). Also, most students disagreed about being motivated to learn because of the economic benefits with (2.33) The results indicated that students rejected the idea that science education is relevant to their life situation with mean of (2.27). Other students had a mean response of (2.61) accepting that science education can help them achieved the career goals. The finding reveled that students do not believe that learning science education is worth their labor in school, thus their perception with a mean of (2.51). Students however rejected the idea that science education is critical for achieving socio-economic stability. Therefore, majority of students had negative perception towards science education and do not accept the idea that science education can be an economic empowerment tool in a period of insecurity and economic downturn.This finding is consistent with Ogbodo (2020) who noted that insecurity and economic downturn affects students' motivation, teachers' morale and academic performance. The finding is supported by Gbamajja (2014) who stressed that there is a clear lack of enthusiasm for science and technology on the part of an increasing proportion of students.

Conclusion

Based on the findings in this study, it was concluded that functional education does not require only dedicated teachers, but also receptive and understanding students. This is because students' academic performance will improved better when students are studying their most preferred course in the learning institution. Also, any negative perception of students about science education or other area of discipline will affect their contribution to the society. This will further worsen the security and economic downturn in the country. Therefore, for education to thrive in an environment, it requires adequate security and conducive learning environment and innovative teaching strategy at all education levels. Science education can guarantee the development of skilled workforce that will excel in entrepreneurship, leadership to build a dynamic economy.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Education stakeholders should encourage students to pursue their desired educational programme and not to be manipulated to enroll in programme which they lack perception and interest.

2. The education system should be reviewed to emphasize on critical thinking, digital literacy for global competitiveness along with vocational training to produce future generation that are self-reliant and can contribute to the socio-economic and growth and transformation.

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