MPRI-JAEE | INTERNATIONAL JOURNAL OF ASSESSMENT & EVALUATION IN EDU.
VOL. 04 NO. 8 – APRIL, 2024

EVALUATION OF PHYSICS TEACHERS' PERCEPTION ON PHYSICS STUDENTS' PERFORMANCE IN THE IMPLEMENTATION OF THE PHYSICS CURRICULUM USING DAVIS PROCESS MODEL AMONG UNITY COLLEGES IN NORTH CENTRAL NIGERIA

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Abstract

This study evaluated Physics teachers' perception on Physics students' performance on Physics curriculum implementation using Davis process model among unity colleges in North-Central Nigeria. The study employed a descriptive survey research design. Eighty-five Physics teachers across all Unity colleges in north-central Nigeria make up the study's population. Students studying physics in Senior Secondary School (SSS) two were the target population. Purposive sampling was employed to select Niger, Nasarawa, and the Federal Capital Territory out of the seven states in North-central, Nigeria. A sample size of 44 Physics teachers were randomly selected from the Unity colleges in the three selected states was used in the study. A researcher developed questionnaire based on Davis Process Model was used for data collection. It was validated by three experts. A reliability coefficient of 0.86 was found after the questionnaire underwent a trial test and the data were statistically analysed using the Cronbach Alpha Correlation Formula. The study's findings study

Keywords:
Evaluation, Physics, Students, Performance, Curriculum, Davis-Process Model.

revealed that Physics teachers have positive perception on Physics students' performance based on Physics curriculum implementation and there was no significance difference in the perception of male and female Physics Teachers on students' performance-based Physics Curriculum implementation. It was recommended that government and stake holders in the education sector should provide more resources to sustain the positive perceptions of the physics teachers.

Introduction

Enhancing the teaching and learning of Science, Technology, and Mathematics (STM) has been recommended by the National Policy on Education (FRN, 2020) as a means of creating a technologically literate workforce that can meet the demands of national development initiatives. This is due to the fact that science education is widely recognised as being important for both individuals and society as a whole, and it is a vital tool for driving technological advancement. As a result, mastering the sciences becomes increasingly crucial for society as a whole as well as for the individual (Offorma, 2015). According to the National Policy on Education (FRN, 2014), Every senior secondary student in Nigeria is required to offer a science subject among which are Physics, Biology or Chemistry or Physics as part of their curriculum. This is due to the fact that these disciplines are the prerequisites for any student wishing to enroll in a technologically focused programme at a higher education institution.

More precisely, in order to equip students to thrive in the modern era of science and technology, the Federal Government of Nigeria places a strong emphasis on scientific education, which is taught at all educational levels and made mandatory in both elementary and secondary schools. In order to be admitted to programmes in pure sciences, medical sciences, agricultural sciences, environmental sciences, and engineering, students must take science as a mandatory subject at the postsecondary level. Furthermore, general education courses covering it are offered to students in all disciplines of study at Nigerian universities, polytechnics, and colleges. Similar to this, the ratio of sciences to liberal arts is 60% to 40% for admission to Nigerian higher education institutions, with a functional integration of theory and practice (Amusa, 2015). The three core sciences taught at the Senior Secondary School level are Biology, Chemistry, and Physics. To meet the prerequisites to enroll in Nigeria's higher education institutions to study natural/pure, physical, environmental, agricultural, and engineering sciences, students must successfully complete these topics at the credit level at the end of their senior secondary school. Standard examinations and assessments demonstrated that students' achievements in sciences is below the expected level (Abdullahi & Bichi, 2015), despite the important role that science and technology play in advancing society and the substantial amount of support provided by the government at all levels. In Nigeria's senior

secondary schools, students' academic performance in the sciences has been extremely underwhelming (Obinna 2019).

In this extremely competitive atmosphere, academic accomplishment is considered as a barometer for students' future success, making it one of the primary goals of school. According to Abdullahi and Bichi (2015), academic accomplishment is regarded as a crucial indicator for assessing a person's overall potential and capacity. Academic achievement is reflected by the amount of proficiency or mastered concepts that have been acquired by a student. Kelly (2018) opined in their study, that, academic accomplishment also refers to the information acquired and the skills gained in a particular topic over the course of education.

Physics is a physical science subject that uses experiments and mathematical analysis to discover quantifiable physical laws for everything from the Nano world of the micro cosmos to the planets, solar systems, and galaxies that occupy the macro universe, according to Norwegian University of Science and Technology (NTNU, 2016). The type of education implemented has a big impact on how a country develops. Such nations' educational policies are based on their needs and ideals. For instance, the Federal Republic of Nigeria's National Policy on Education for Nigeria highlighted the necessity of teaching Nigerian individuals how to influence their environments for societal progress. The policy emphasized that education must lead to man being trained to comprehend his environment. A relevant education system with a suitable curriculum must be put in place for a country to flourish properly.

The goal of teaching Physics in schools is to produce young scientists who will create the technological innovations that will help people live more comfortably and easily go about their daily lives National Policy on Education (FRN, 2014). Despite the introduction of the Physics curriculum to Nigerian schools many years ago, the nation still lacks the technology that may improve living conditions and make life more enjoyable (Ajayi, 2017). Since the goals are not being met, one can wonder if the curriculum is not being implemented effectively. The National Curriculum for Senior Secondary Schools created by the Federal Ministry of Education in 2022 and the National Policy on Education of the Federal Republic of Nigeria (FRN, 2020) both state that Physics instruction in secondary schools should foster the development of students' fundamental scientific knowledge, attitudes, and abilities in order to prepare them for technological applications that will inspire and foster their creativity.

Study by Ajayi (2017), have shown that a number of factors, such as poor instruction, lack of learning resources, student attitudes, governmental policies, parental backgrounds, lack of student readiness, poor management style, and shortage of qualified teachers, have affected the teaching and learning outcomes of Physics over the years. The sort of scientists, technicians, engineers, and doctors that society produces is frequently determined by the type of science that is taught in schools and the depth with which Physics is covered in curricula. The aim of the Physics curriculum is to advance science and

technology in order to improve the environment and make it more hospitable for humans. To give future engineers, technicians, scientists, and medical professionals a strong basis, specialists created the Physics curriculum for senior high school education (FRN, 2020). In senior secondary schools, the course of instruction lasts three years. It includes a number of themes and subtopics that students are required to master before taking the Senior Secondary School Examinations. Each Physics course has a distinct objective that, if not taught, might have an impact on the learner's performance in the Senior Secondary School Examinations and their future profession.

The list of classes and their subjects that are provided at a school or university make up the curriculum. A more comprehensive syllabus serves as the foundation for a prescriptive curriculum, which basically lists the things that should be learnt and the extent it should be learnt in order to acquire a certain grade and qualification. Hence, all of a school's formal activities can be termed curriculum. According to (Kelly, 2018), the school's planning and directing of all learning, whether it is done in collaboratively or alone, within or outside the school, is known as the curriculum. In other words, the curriculum outlines our goals and the methods we will use to attain them. Offorma (2015), stated that a curriculum is a deliberate learning experience that is provided to students. It is a three-part program of studies, consisting of a program of studies, an activity program, and supervision. Thus, to accommodate educational requirements of various courses of study, a curriculum was described as a set of knowledge items and/or subjects by (Amusa, 2015). The curriculum is the vehicle through which information, competence and abilities are inculcated or given to students using the most efficient techniques possible. The curriculum is an organized, prepared and planned study guide that comprises of the learning experiences and objectives that will be achieved in order to attain educational goals. Curriculum is a resource in education that helps to cultivate and educate a full person. The curriculum, according to a modern view, includes all of the information and experiences learners gains within and outside of the school's walls, whether they are scheduled lessons or extracurricular activities.

A brief synopsis of the procedures involved in "assessment of curriculum implementation" is given by the Davis Process Model. It's appropriate for use by individual educators. This model's initial phase is referred to as the delineating sub-process by Davis (1980). The judgements that determine the structure and emphasis of the evaluation are necessary because no examination of classrooms or curricula will be able to capture the entire picture. The information may also differ and might include organisational structures, curriculum performance, learners' performance, community perceptions, educator attitudes, and strategy choices.

Davis Process Model focuses on the evaluation of, student performance, organizational structure, strategy choice, instructors' attitudes, curriculum performance, and community perception. The public is upset with students' Physics performance, and this is because secondary schools in Nigeria cover non-curriculum topics such topics that are

not relevant to students' academic achievement in physics. For instance, despite how crucial Physics is to a country's technological growth, Akuche and Okunola (2017) found that student performance in the subject remained below average. In order to address the alleged causes of students' low performance in Physics, Research has been conducted over the years and is still ongoing. The failure faced in external Physics examinations is could be traced to challenges faced in the implementation of the Physics curriculum and problems associated with curriculum implementation. Some of the basic implementation problems are inadequate and qualified physics teachers, poor teaching methods, inadequate infrastructure, such as enough classroom, school bus, laboratory among others (Isa & Ayodele, 2019). This research work seeks to find out if the Physics curriculum is properly implemented among Unity Colleges in North-Central Nigeria and to further research into the areas of weakness and areas of strength in the Physics curriculum. To this end, the researcher seeks to use the Davis Process Model to evaluate Senior Secondary School Physics Curriculum Implementation in North-Central Nigeria.

Research Objectives

The study aimed to evaluate Physics Teachers Perception on Physics students' performance on Physics curriculum implementation using Davis process model among unity colleges in North-Central Nigeria. Specifically, the objectives of the study are:

1. To determine the perception of Physics teachers on Physics students' performance based on the implemented Physics curriculum in North-Central Nigeria.
2. To determine the perception of the male and female Physics teachers on students' performance based on Physics curriculum in North-Central Nigeria

Research Questions

1. What is the perception of Physics teachers on Physics students' performance based on Physics curriculum in North-Central Nigeria?
2. What is the perception of the male and female Physics teachers on students' performance based on Physics curriculum in North-Central Nigeria?

Research Hypotheses

HO_1: There is no significant difference in the perception of male and female teachers on the students' performance in Physics with regards curriculum implementation.

Materials and Methods

This research employed a descriptive survey research design, this is because, it will enable the researcher gather vast data from heterogeneous audience involving the use of questionnaire as instrument. This approach will be used in Assessing Teachers, community and Students' Perceptions on curriculum implementation to evaluate Physics

curriculum using Davis process model in North Central Nigeria. The study's population comprises of all Physics teachers in all the Federal Unity schools in North-Central Nigeria. As at the time of this research, there are 85 Physics teachers in all the Unity colleges in North-central Nigeria as revealed by the Federal Ministry of Education (MOE 2023).

The sample for the study consists of all Physics teachers, in north-central Nigeria. 44 Physics teachers in the selected schools was used for the study, There are seven states in the north-central region. The states are formed into strata, that is, Niger and Kogi State, Benue and Kwara State, then Plateau and Nasarawa State. Purposive sampling is then employed to select Niger, Nasarawa, and the Federal Capital Territory. The Federal Capital Territory is selected because of its peculiar position as the capital of Nigeria and its centrality, Niger and Nasarawa is selected because both state shares boundary with the federal capital territory and to keep the volume of work within a manageable proportion two Unity Colleges from the selected states will be use to collect data using the instrument. There are twenty-four (24) Unity schools in the North Central. The states selected have fifteen (15) Unity Colleges, forming 62.5% of the entire Unity Schools as revealed in the table1 below. This sample size was achieved in accordance to sample size determination table by Krejcie and Morgan.

Table 1 Sample size for Physics Teachers based on sample size determination by Krejcie and Morgan

State	Teachers
Niger	13
FCT	30
Nasarawa	10
Total	53
Sample Size	**44**

Table 2: Sample size of selected School

State	Teachers
Niger	12
FCT	20
Nasarawa	12
Total	**44**

Federal Ministry of education Abuja (2023)

Sample distribution based on gender

Sample distribution of respondents based on gender is presented in Table 3.

Table 3: Sample distribution of respondents based on gender

Respondents	Gender	Frequency	Percent
Teachers	Male	30	68.2
	Female	14	31.8

Table 3 shows the sample distribution of respondents based on gender. Thirty of the teachers' respondents are male, representing 68.2% of the teachers' respondents. While, fourteen representing 31.8% of the teachers' respondents were females. This implies that most of the teachers' respondents are males.

Researcher developed questionnaire named Secondary School Curriculum Evaluation for Teaching and Learning of Physics Questionnaire for Teachers (SSCETLPQT) was used for collecting the data during the study. One expert from Veritas University Bwari Abuja and two experts from the Department of Science Education at the Federal University of Technology Minna, Niger State, examined the Face and Content Validity of the Questionnaire for Teachers (SSEPCIQT). In order to ascertain the instrument's reliability even further, a pilot study was conducted on ten teachers in Niger State. Upon receiving the questionnaires back, the copies were coded and subjected to reliability statistics through the use of Cronbach's Alpha Reliability Test. The results indicated that the instrument is appropriate for the study a reliability index of 0.86.

Result and Discussions

Answering Research Questions

Two research questions raised in this work were answered using Mean and Standard Deviation. The answers to the questions are presented as follow:

Research question one

What is the perception of the teachers on students' performance based on Physics curriculum in North-Central Nigeria? Mean and Standard Deviation were employed to answer question one as presented in Table 4

Table 4: Mean and Standard Deviation on perception of the teachers on students' performance based on Physics curriculum in North-Central Nigeria

S/N	Items	N	Mean	Std.	Decision
1	Physics students in North-Central region of Nigeria can compete with other Physics students globally based on the current Physics curriculum	44	2.86	0.82	Agree
2	Physics students in the North-Central do well in internal examinations	44	2.91	0.74	Agree
3	Performance of students In Physics practical in the North-Central Nigeria is improving under the current curriculum	44	2.73	0.76	Agree
4	The performance of students in external examinations in North-Central Nigeria In Physics is appreciating over the years	44	2.70	0.79	Agree
5	The performance of students in internal (teacher made) examinations in North-Central Nigeria In Physics is appreciating over the years	44	2.68	0.77	Agree

6	Physics students in the North-Central do well in external examinations	44	2.70	0.76	Agree
7	Students in the North-Central Nigeria do well in Local Physics Competition	44	2.70	0.73	Agree
8	Physics students in the North-Central do Physics related Courses in the higher institution of Learning	44	2.73	0.76	Agree
9	Physics students perform well in exhibitions	44	2.59	0.69	Agree
10	Physics students show strong apt and proficiency In Physics	44	2.50	0.63	Agree
	Average	**44**	**2.71**	**0.75**	**Agree**

Decision Mean: 2.5

Table 4 presents the mean and standard deviation on perception of the teachers on students' performance based on Physics curriculum in North-Central Nigeria. The mean of 2.5 and above was used as the bench mark for '**Agree**' and the mean of less than 2.5 was considered '**Disagree**'. Consequently 10 items were listed, the table revealed that all the items had mean scores between 2.50 and 2.91 which are above the benchmark of 2.5; this implies that teachers agreed on the positive perception on performance of Physics students with respect to curriculum implementation in North-Central Nigeria to the items. Table 4 also revealed that, on the basis of curriculum implementation in North Central Nigeria, teachers have positive perception on students' performance based on curriculum implementation, as evidenced by the average mean score response to the 10 items, which is 2.71, above the decision mean of 2.5. Hence, teachers perceived that Physics students' performance are satisfactory based on Physics curriculum in North Central Nigeria. The standard deviation of the respondents on the perception on performance of Physics students based on curriculum in North Central Nigeria is between 0.63 and 0.82, while the average standard deviation is 0.75; signifying that there was no meaningful deviation of respondents' perception on students' performance based on curriculum in North Central Nigeria from each other and the average standard deviation of the group.

Research question two

What is the perception of the male and female Physics teachers on students' performance based on Physics curriculum in North-Central Nigeria?

Table 5: perception of the male and female Physics teachers on students' performance based on Physics curriculum in North-Central Nigeria?

Gender	N	Mean Rank	Sum of Ranks	Mean Rank Difference
Male	30	21.20	636.00	
				4.09
Female	14	25.29	354.00	

From the table 5. The mean rank and sum of ranks of male teachers are 21.20 and 636.00. While, the mean rank and sum of ranks of female teachers are 25.29 and 354.00 with a mean rank difference of 4.09. The mean rank difference indicates that both male and female teachers hold similar perceptions on Physics students' performance with respect to physics curriculum implementation.

Hypothesis one

There is no significant difference in the perception of male and female teachers on the students' performance in Physics with regards curriculum implementation. In testing hypothesis three, the perception of male and female teachers on the students' performance in Physics with regards curriculum implementation was analysed Mann-Whitney U test as presented in Table 6 below.

Table 6: Mann-Whitney U test on perception of male and female teachers on the students' performance in Physics with regards curriculum implementation

Gender	N	Mean Rank	Sum of Ranks	Mann-Whitney U	P-value
Male	30	21.20	636.00		
				171.000	0.324^{ns}
Female	14	25.29	354.00		

NS: Not Significant at 0.05 (p>0.05)

Table 6 shows the Mann-Whitney U test on perception of male and female teachers on the students' performance in Physics on curriculum implementation. From the table, the mean rank and sum of ranks of male teachers are 21.20 and 636.00. While, the mean rank and sum of ranks of female teachers are 25.29 and 354.00 with a U-value = 171.000, p = (0.324) > 0.05. Hence, hypothesis one was not rejected; this implied that there is no significant difference in the perception of male and female teachers on the students' performance in Physics with regards curriculum implementation; this implies that both male and female teachers' perception on performance of Physics students with respect to curriculum implementation are the same.

Summary of Findings

i. Teachers have positive perception on Physics students' performance based on curriculum implementation in North-Central Nigeria;
ii. There was no significance difference in the perception of male and female Physics teachers on students' performance in Physics with regards curriculum implementation in North-central, Nigeria;

Discussion of Findings

Finding emanating from this research showed revealed that teachers have positive perception on students performance of Physics curriculum in North-Central Nigeria. This

finding agrees with that of Newzat (2016) whose finding indicated that instructors' opinions of the High School Teaching Program's components were average. Similarly, Batool and Umbreen (2018) study re-examines the objectives of National Chemistry Curriculum and identifies the nature of implementation of chemistry curriculum to be appropriate. However, in contradiction, Meryem and Gorecek (2014) results of the study showed that teachers believed that the curriculum's activities weren't appropriate for use in a classroom setting.

Conclusion

The study affirmed that both male and female teachers have positive perception on students' performance based on curriculum implementation in North-Central Nigeria.

Recommendations

Teachers have positive perception on the performance of Physics curriculum. Therefore, materials, laboratories, equipment, facilities and resources for the implementation of the Physics curriculum should be provided by the government. More resources should be provided by stake holders and the Government, to sustain the perceptions of the teachers on students' performance.

References

Abdullahi, S., & Bichi, A. A. (2015). Gender disparity in English language learners' academic performance. *Kano Journal of Educational Studies,* 4(2), 31-38

Ajayi, P. O (2017). *The impact of both theoretical and practical approaches on the performance of students in Physics at specific secondary schools in the Akure South Local Government Area of Ondo State*. A thesis for M. Ed. Ado-Ekiti University in Nigeria.

Amusa, J. O. (2015). The foundation of a thriving community and sustainable development is physics education. *International Journal of Research in STEM Education*, 3(1), 173 – 184.

Davis, E. (1980). *Educators as curriculum evaluators, Sydney George* Allen and Unwin, Sydney.

FMOE (2023) Federal Ministry of Education

FRN (2014). National policy on education

FRN (2020). National policy on education

Isa, S. A., & Ayodele, B. N. (2019**).** *Obstacles to the new secondary school physics curriculum's successful* adoption in Nigeria's public and private institutions.

Kelly, A. V. (2018). *The Curriculum Theory and practice 4th edition*. London: Paul Chapman.

Meryem, B. N., & Gorecek, G. (2014) reviewed the grade 9Physics curriculum based on teachers' views. *Procedia Social and behavioural science*. World conference on educational sciences

NTNU (2016). *Physics education*. Retrieved August 19, 2022 from https//www.ntnu.edu/physics

Obinna, I. P. (2019). The role of effective teaching in curriculum implementation. *Nigerian Journal of Curriculum Studies,* 14(2), 35-46.

Offorma, D. (2015). A critical evaluation of the Nigerian secondary school curriculum's implementation strategy: promoting youth socioeconomic empowerment (Published Research Work)