



# Evaluation of Physics Students' Perception on Physics Teachers' 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 students' perception of Physics teachers' performance on Physics curriculum implementation using Davis process model among unity colleges in North Central Nigeria. The study was guided by two objectives, two research questions and one null hypotheses. The study used a descriptive survey research design. The population for the study consists of all the Unity colleges in North-central Nigeria. The target population were Senior Secondary School (SSS) two Physics students. 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 385 Physics students were randomly selected from the Unity colleges in the three selected states and were used in the study. The questionnaires used for data collection in the study was based on Davis Process Model. It was validated by three experts. The questionnaire was trial tested and the data obtained were subjected to statistical analysis using Cronbach Alpha Correlation Formula and reliability coefficient of 0.86 was obtained. Descriptive statistics of Mean and Standard Deviation was used to answer the research questions. Null hypotheses were analysed using Mann-Whitney U test. Findings of the study revealed that, Physics students have negative perceptions on the strategies adopted by Physics teachers and the perception for both male and female Physics students is negative, this implies that, physics students in north Central Nigeria are not contented with the teaching strategies adopted by Physics teachers in accordance with Davis process Model in the Implementation of the Physics Curriculum. In line with the findings, it is

recommended that, training and re-training of Physics teachers should be organized for Physics teachers among Unity colleges in North Central Nigeria on evaluation strategies and skills.

**Key words:** Evaluation, Physics, Students, Performance, Curriculum, Davis-Process model.

## I. Introduction

The six geopolitical areas that make up the Federal Republic of Nigeria are the North-Central, North-East, North-West, South-East, South-South, and South-West regions. The Federal Capital Territory of Abuja is one of 36 states that make up these geopolitical areas (Ukeje, 2016). In order to lay a solid foundation for a technologically oriented workforce in line with the needs of national development efforts, the National Policy on Education (FRN, 2020) has advocated improvements in the teaching and learning of Science, Technology, and Mathematics (STM). This is because the importance of science education to individuals and society at large is widely acknowledged, and it is an essential tool in our society 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), each senior secondary student in Nigeria is required to take a science subject (Biology, 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 specifically, the Federal Government of Nigeria stresses scientific



education, which is taught at all educational levels and made mandatory in both elementary and secondary schools, in order to prepare pupils to live successfully in this contemporary age of science and technology. Science is a required subject at the tertiary level and is part of the admissions requirements for programs in pure sciences, medical sciences, agricultural sciences, environmental sciences, and engineering. Additionally, it is covered in general education courses in Nigerian universities, Polytechnics, and Colleges for students in all fields of study. Similar to this, for the purposes of admission into Nigerian higher education institutions, the proportion of sciences to liberal arts is 60% to 40%, with functionality and integration of theoretical and practical. (Amusa, 2015). The three core sciences taught at the Senior Secondary School level are Biology, Chemistry, and Physics. To meet the prerequisites for admission to study natural/pure, physical, environmental, and agricultural sciences and engineering in Nigeria's higher educational institutions, students must pass these subjects at the conclusion of their senior secondary school at the credit level. Standard examinations and assessments demonstrated that students' achievements in sciences is below the expected level (Abdullahi & Bichi, 2015), despite the critical role played by science and technology in progressing society and much of Government assistance at all levels. In Nigeria's senior secondary schools, pupils' 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 accomplishment is defined as the "amount to which a student is benefiting from instruction in a particular area of learning, that is, the achievement is reflected by the amount of skill or knowledge that has been imparted to him. 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 natural science that relies on experiments, measurements, and mathematical analysis to discover quantitative 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 secondary school curricula. The goal 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 Latin term "currere" (which means "race course") was used to create the English word curriculum, which refers to the sequence of actions and experiences that help youngsters develop into responsible people. 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 must be comprehended and to what level in order to meet a certain grade or norm. In other words, all of a school's courses may be referred to as its curriculum. According to (Kelly, 2018), the school's planning and directing of all learning, whether it is done in groups or alone, inside the school or outside, 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. In order to accommodate the educational requirements of various courses of study, the definition of the term "curriculum" has also altered. A curriculum was described as a set of knowledge items and/or subjects by (Amusa, 2015). The curriculum is the vehicle through which knowledge and skills are imparted or given to students using the most efficient techniques possible. The curriculum is a structured plan of study that includes the learning experiences and objectives that will be employed to attain these goals. In a broader sense, it is a method of educating people so that, they can contribute to society and be valuable members of it. Curriculum is a tool in education that helps to humanize and educate the full person. The curriculum, according to a modern view, includes all of the information and experiences learners gain within and outside of the school's walls, whether they are scheduled lessons or extracurricular activities (Akinsola & Abe, 2016).

Davis Process Model provides a simple overview of the processes involved in evaluation of curriculum implementation. It is suitable for use by individual teachers. The first stage of this

model involves what Davis (1980) calls the delineating sub-process. No investigation of classrooms or curricula will be able to capture the total picture so decisions must be made which structure and focus the evaluation. Evaluators should begin by asking for whom is the evaluation intended and what does the audience want to find out. Examples of prospective audiences might include: teacher, senior administrators (senior masters/mistresses, deputies, principals), Ministry of Education Officials, parent and community groups commercial organizations

The type of information will also vary and could include: teacher attitudes, student performance, community perceptions, organizational structures, curriculum performance, strategy selection.

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 as 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 the Senior Secondary School Physics Curriculum Implementation in North-Central Nigeria.



## II. Research Objective

The aim of the study is to evaluate Physics student Perception on Physics teachers' performance on Physics curriculum implementation using Davis process model among unity colleges in North Central Nigeria. Specifically, the objectives of the study are as follows:

1. To determine perception of Physics students on strategies adopted by Physics teachers in evaluating Physics students in North central, Nigeria.
2. To determine perception of male and female students on strategies adopted by Physics teachers in evaluating Physics students in North-Central Nigeria.

## III. Research Questions

1. What is the perception of students on strategies adopted by Physics teachers in evaluating Physics students in North central, Nigeria?
2. What is the perception of male and female students on strategies adopted by Physics teachers in evaluating Physics students in North-Central Nigeria?

## Research Hypotheses

H<sub>01</sub>. There is no significance difference in the perception of male and female students on the strategies adopted by Physics teachers on curriculum implementation

## IV. Materials and Methods

This research adopted a descriptive survey research design, this is because, it enabled the researcher gather vast data from heterogeneous audience involving the use of questionnaire as instrument. This approach was used in Assessing Students' Perceptions on teachers' performance on Physics curriculum implementation using Davis process model in North Central Nigeria. 385 SS II students that offer Physics were used for the study. There are seven states in the north-central region.

The states were formed into strata, that is, Niger and Kogi State, Benue and Kwara State, then Plateau and Nasarawa State. Purposive sampling was then employed to select Niger, Nasarawa, and the Federal Capital Territory. The Federal Capital Territory was selected because of its peculiar position as the capital of Nigeria and its centrality, Niger and Nasarawa were 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 were used 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 table 1 below. The sample size was done based on Krejcie and Morgan sample size determination table.

The instruments, Secondary School Evaluation of Physics Curriculum Implementation. Questionnaire for Students (SSEPCIQS) was subjected to both face and content validity by experts in the Depart of Science and Technology Education at the Federal University of Technology Minna, Niger State and one expert from Veritas University Bwari Abuja

A pilot study was carried out on the instrument to further determine its reliability. The pilot study was carried out on 60 students in Niger State. The copies of questionnaire were returned. These were coded and subjected to reliability statistics using Cronbach's Alpha Reliability Test. The result showed 0.86, reliability of the instrument which was considered adequate. The collected data were analyzed using mean and standard deviation to answer the research questions while Mann-Whitney U test was be used for testing the null hypotheses at 0.05 level of significance. Items with mean criterion of 2.50 and above was accepted while a mean below 2.50 criterion was rejected. For the test of hypothesis, the null hypothesis was rejected if the p value is equal to or greater than the 0.05, the null hypothesis was not rejected if the p value is be less than 0.05.

**Table 1 Sample size for Physics Students, based on Krejcie and Morgan sample size determination**

State	Students
Niger	1,837
FCT	2,719
Nasarawa	1,039
Total	5,595
<b>Sample Size</b>	<b>385</b>



**Table 2: Sample size of selected Schools**

State	Student
Niger	125
FCT	135
Nasarawa	125
<b>Total</b>	<b>385</b>

Source: Federal Ministry of education Abuja (2023)

**Answer to Research Question**

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

**Research question one**

1.What is the perception of students on strategies adopted by Physics teachers in evaluating Physics students in North central, Nigeria?

To answer research question one, Mean and Standard Deviation were used as presented in Table 3

**Table 3: Mean and Standard Deviation on perception of students on strategies adopted by Physics teachers in evaluating Physics students in North central, Nigeria**

S/N	Items	N	Mean	Std.	Decision
1	My Physics teacher evaluates us on every topic taught (Diagnostic evaluation)	334	2.93	0.79	Agree
2	My Physics teacher evaluates us on every lesson taught (Formative evaluation)	334	2.93	0.80	Agree
3	My Physics teacher evaluates us at the end of every week or term (Summative evaluation)	334	2.81	0.93	Agree
4	We do practical often	334	2.34	0.96	Disagree
5	Quiz competition is organized often by our Physics teacher	334	1.81	0.82	Disagree
6	My Physics teacher organizes inter-class Physics competition regularly	334	1.78	0.85	Disagree
7	Our Physics teacher engages us in project work	334	2.42	1.07	Disagree
8	We do practical test in Physics	334	2.51	1.09	Agree
9	We do practical examination in Physics	334	2.48	1.13	Disagree
10	The Physics department organizes exhibition termly in Physics	334	2.07	0.95	Disagree
<b>Average</b>		<b>334</b>	<b>2.41</b>	<b>0.94</b>	<b>Disagree</b>

**Decision Mean: 2.5**

Table 3. presents the mean and standard deviation on perception of students on strategies adopted by Physics teachers in evaluating Physics students 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 item 1, 2, 3, and 8 had mean scores between 2.51 and 2.93 which are above the benchmark of 2.5; this implies that students agreed to have positive perception on strategies adopted by Physics teachers in evaluating Physics students in North central, Nigeria. However, item 4, 5,6,7,9 and 10 had mean scores between 1.78 and 2.48

which is less than the benchmark of 2.5; this implies that Physics students’ have negative perception on strategies adopted by Physics teachers in these items.

The table further revealed that the average mean score response to the 10 items is 2.41, which is below the decision mean of 2.5; this indicates that Physics students have negative perception on the strategies adopted by Physics teachers in evaluating Physics students in North central, Nigeria. Hence, Physics students perceived that, strategies adopted by Physics teachers in evaluating Physics students are not effective in North central, Nigeria. The standard deviation of





the respondents on the perception of the strategies adopted by Physics teachers in evaluating Physics students in North central, Nigeria is between 0.57 and 1.13, while the average standard deviation is 0.94; signifying that there was no meaningful deviation on the perception of students on strategies adopted by Physics teachers in evaluating Physics students in North central, Nigeria.

#### Research question two

What is the perception of male and female students on strategies adopted by Physics teachers in evaluating Physics students in North central? Mean rank and sum of ranks were used to answer this research question as presented in Table 4

**Table 4.: Mean Rank and Sum of Ranks on the perception of male and female students on strategies adopted by Physics teachers in evaluating Physics students in North central**

Gender	N	Mean Rank	Sum of Ranks	Mean Rank Difference
Male	160	170.05	27208.50	4.90
Female	174	165.15	28736.50	

From the table, the mean rank and sum of ranks of male students are 170.05 and 27208.50. While, the mean rank and sum of ranks of female students are 165.15 and 28736.50 with a Mean Rank Difference of 4.90 which is insignificant, indicating both male and female Physics Students hold similar perception on the strategies adopted by Physics Teachers in the implementation of the Physics Curriculum.

#### Testing of Research Hypotheses

One formulated research hypotheses was tested at 0.05 level of significance using Mann-Whitney U test as follows:

#### Hypothesis

There is no significance difference in the perception of male and female students on the strategies adopted by Physics teachers on curriculum implementation.

In testing the hypothesis, the perception of male and female students on strategies adopted by Physics teachers on curriculum implementation was analysed Mann-Whitney U test as presented in Table 5.

**Table 5: Mann-Whitney U test on the perception of male and female students on the strategies adopted by Physics teachers on curriculum implementation**

Gender	N	Mean Rank	Sum of Ranks	Mann-Whitney U	P-value
Male	160	170.05	27208.50	13511.500	0.643 <sup>ns</sup>
Female	174	165.15	28736.50		

NS: Not Significant at 0.05 ( $p > 0.05$ )

Table 5. shows the Mann-Whitney U test on the perception of male and female students on the teaching strategies adopted by Physics teachers on curriculum implementation. From the table, the mean rank and sum of ranks of male students are 170.05 and 27208.50. While, the mean rank and sum of ranks of female students are 165.15 and 28736.50 with a U-value = 13511.500,  $p = 0.643$ . The p-value is greater than the level of significance, hence hypothesis eight was not rejected. Therefore, there is no significance difference in the perception of male and female students on the teaching strategies adopted by Physics teachers on curriculum implementation; this implies that both male and female students on

the teaching strategies adopted by Physics teachers on curriculum implementation are the same.

#### V. Summary of Findings

- Physics students have negative perception on the strategies adopted by Physics teachers in evaluating Physics students in North central, Nigeria;
- there was no significance difference in the perception of male and female students on the teaching strategies adopted by Physics teachers on curriculum implementation in North central, Nigeria;



## VI. Discussion of Findings

The study revealed that Physics students have negative perception on the strategies adopted by Physics teachers. This finding is in line with that of Samuel (2015) whose finding showed that ineffective evaluation methods affect the implementation of the social studies curriculum. Tobi (2015) study also showed that schools' teachers do not make use of these materials. Similarly, the study also revealed that there was no significance difference in the perception of male and female students on the strategies employed by Physics curriculum in North central Nigeria. This implies that, male and female students of Unity colleges in north central Nigeria are not comfortable with the strategies employed by Physics teachers in evaluation in accordance with Davis process model.

## VII. Conclusion

The study affirmed that both male and female students do not appreciate the strategies employed in evaluation by Physics teachers, teaching in Unity colleges in North Central Nigeria.

## Recommendations

Based on the findings of this work, it is recommended that:

Training and re-training of Physics teachers should be organized on best practices and strategies on evaluation.

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