

IDENTIFICATION OF LEARNING DIFFICULTIES OF SENIOR SECONDARY SCHOOL PHYSICS STUDENTS

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Abstract

The study employed a descriptive survey to investigate physics students' identification of learning difficulties of senior secondary school physics students. The sample size used is the total population of 190 (105 male and 85 female) senior secondary school 11(SSS2) physics students from four senior secondary schools in Umuhia North LGA of Umuhia Education Zone of Abia State. The instrument for data collection was the researchers developed structured questionnaire on physics students' perception of learning difficulties of senior secondary school physics students. Two research questions and one null hypothesis tested at 0.05 level of significance guided the study. The instrument was validated and the reliability index of 0.76 was obtained. The research questions were answered using mean while the hypothesis was tested with chi-square statistics. Results showed that difficulty with reading and/or writing, problems with mathematics skills, difficulty in remembering, problems paying attention, trouble following directions, poor coordination, difficulty with concepts related to time and problems staying organized were agreed to be learning difficulties of senior secondary school physics students. Recommendations were made based on the findings.

Introduction

Science comprises the basic discipline such as Physics, Chemistry, Mathematics and Biology. Physics which is one of the core sciences is crucial in the understanding of the world around us, the world inside and the world beyond us. It is the most basic and fundamental science. Physics challenges our imagination with concepts like relativity theory which leads to great discoveries and technologies that change our lives. Its importance cannot be over emphasized hence the need for many citizens to study the subject with utmost understanding. According to Erinosh (2013) physics is basic for understanding the complexities of modern technology, and essential for technological advancement of a nation.

In spite of the importance of physics, it remains the least favored science subject among students generally (Erinosh, 2013). This Erinosh (2013), opined is generating concerns among science educators, and

researchers are increasingly exploring why students avoid the subject. Literature has shown that students generally regard physics as conceptually difficult, abstract, uninteresting, and elite discipline only suitable for exceptionally talented and gifted pupils (Doug, 2010). Williams, Stanisstreet, Spall, Boyes, and Dickson (2003) in their survey of why secondary school students in the United Kingdom are not interested in studying physics, reported that students perceive physics to be a difficult/hard subject and have lower expectations of their ability to accomplish physics tasks.

According to Erinoshio (2013), in Nigeria, the evidence of low enrolment and massive failure in Secondary School Certificate Examination (SSCE) and National Examinations Council (NECO) in physics is indicative that many students have difficulty learning the subject. Explaining further Erinoshio (2013) reported that consistently for five years, on the average, less than 30% of the total students registered for senior secondary school certificate examination (SSSCE) entered for physics and more disturbing is the low level of performance of students; on the average, slightly over 30% of the students who sat for Physics passed at the credit level compared to well over 40% in biology and chemistry generally. Physics as a discipline requires learners to employ a variety of methods of understanding and to translate from one to the other; words, tables of numbers, graphs, equations, diagrams, maps. Physics requires the ability to use algebra and geometry and to go from the specific to the general and back. This makes learning physics particularly difficult for many students. Students' having difficulty in physics has been attributed to various factors which include factors that are related to the students that they are capable of controlling, factors related to the course and factors inherent in the nature of physics (Ornek , Robinson and Haugan, 2008). Students are of the opinion that physics is difficult and too abstract to understand. This may be due to the fact that students encounter some learning disabilities during the study of physics. Hence the need to assess secondary school students' learning difficulties in the study of physics.

Learning difficulties are encountered by students when dealing with neurologically-based processing problems. These processing problems can interfere with learning basic skills such as reading, writing and/or math. They can also interfere with higher level skills such as organization, time planning, abstract reasoning, long or short term memory and attention. It is important to realize that learning difficulties can affect an individual's life beyond academics and can impact relationships with family, friends and in the workplace. Since difficulties with reading, writing and/or math are recognizable problems during the school years, the signs and symptoms of learning difficulties are most often diagnosed during that time.

Physics Students' learning difficulties can be associated with the fact that they have to contend with many representations - such as experiments, formulas and calculations, graphs, words, conceptual explanations - at the same time, and they have to make transformations among them (Reddish 1994). According to Reddish (1994), Physics as a discipline requires learners to employ a variety of methods of understanding, the ability to use algebra and geometry and to go from the specific to the general and back which makes learning physics particularly difficult for many students. No wonder Harry (2011) opined that students' poor attitude towards physics, lack of motivation, poorly resourced teaching and learning environment, poor mathematical ability and poor teaching method are some of the reasons adduced for poor learning in physics in Nigeria.

Many students have difficulty with reading, writing, or other learning-related tasks at some point, and have several related signs, which persist over time. The signs of learning difficulties vary from person to person. According to the American Academy of Child and Adolescent Psychiatry (2011), common signs that a person may have in learning include difficulty with reading and/or writing, problems with math skills, difficulty remembering, problems paying attention, trouble following directions, poor coordination, difficulty with concepts related to time, problems staying organized, impetuous behaviour, difficulty finding the right way to say something, difficulty listening well, problems dealing with new things in life and problems understanding words or concepts.

The secondary school physics curriculum is designed to provide students with knowledge and skills that will enable them solve problems and make decision in everyday life (Salmiza, 2014). Since physics has been severally labelled as the most conceptually difficult science subject, it is important to explore the underlying difficulties that might impede quality learning in the subject in the context of Nigeria school environment (Erinosho, 2013). According to him, when teachers recognize these difficulties, it helps them to choose appropriate and efficient teaching methods and techniques.

Students need knowledge, problem-solving skills, creative and critical thinking for proper adjustment into a fast scientifically and technologically developing society like ours. Students must therefore be taught to meet up with the challenges ahead and demand by daily living. Bearing in mind the nature of physics, there is therefore, the need for the teacher to teach the subject in such a way as to eliminate these learning difficulties in the teaching of the subjects so as to enable the students learn and acquire positive attitudes and values, process skills and problem-solving skills. This could be done by

identifying these learning difficulties and finding a way of teaching the subject to eliminate these difficulties. Hence the need for the study.

The study therefore identified learning difficulties of senior secondary school physics students as perceived by physics students in Umuahia North Local Government Area of Abia State.

The following research questions guided the study.

1. What are the mean perception scores of secondary school physics students' perception of learning difficulties of secondary school physics students?
2. What are the mean perception scores of secondary school physics male and female students' perception of learning difficulties of secondary school physics students?

While one hypothesis below tested at $P < 0.05$ probability level guided the study

There is no difference in the mean scores of secondary school physics students.

Method

The study employed a descriptive survey to identify learning difficulties of senior secondary school physics students. A sample of 190 (105 males and 85 females) senior secondary school 11 (SSS2) physics students from four senior secondary schools in Umuahia North LGA of Umuahia Education Zone of Abia State was used. The instrument for data collection was the researchers developed structured questionnaire on senior secondary school physics students' learning difficulties. The responses were Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) weighted 4, 3, 2, 1 respectively. The instrument was validated using Cronbach Alpha and the reliability index of 0.76 was obtained. It is a thirteen-item questionnaire that is made up of some learning difficulties that senior secondary school physics students' encounter during the learning of physics. The questionnaires were distributed by the researcher and collected back and so the percentage return was 100%. The research questions were answered using mean while the hypothesis was tested with Chi-Square statistics.

Result**Table 1:** Scores of physics students on the learning difficulties of secondary school physics students in the study of physics.

S/N	ITEM	SA	A	D	SD	Mean	Remarks
1.	Difficulty with reading and/or writing	90	68	22	10	3.25	Agree
2.	Problems with math skills	105	52	33	-	3.38	Agree
3.	Difficulty remembering	95	70	20	5	3.34	Agree
4.	Problems paying attention	85	80	25	-	3.32	Agree
5.	Trouble following directions	105	75	8	2	3.49	Agree
6.	Poor coordination	120	70	-	-	3.63	Agree
7.	Difficulty with concepts related to time	69	78	33	10	3.08	Agree
8.	Problems staying organized	105	65	15	5	3.42	Agree
9.	Impetuous behaviour	98	72	18	2	3.40	Agree
10.	Difficulty finding the right way to say something	70	97	17	6	3.22	Agree
11.	Difficulty listening well	82	75	23	10	3.21	Agree
12.	Problems dealing with new things in life	70	88	20	12	3.14	Agree
13.	Problems understanding words or concepts	79	68	23	20	3.08	Agree

Result in Table 1 showed that all the items had mean scores between 3.08 and 3.63 which are greater than 2.50, which is the mean value of the four point scale used for the study. The Table also showed that all the teachers agreed that all the thirteen items listed above are learning difficulties of secondary school physics students in the study of physics.

Table 2: Scores of male and female physics students on the learning difficulties of secondary school physics students in the study of physics.

S/N	ITEM	Mean Male(X)	Remarks	Mean Female(X)	Remarks
1.	Difficulty with reading and/or writing.	3.30	Agree	3.20	Agree
2.	Problems with math skills	3.71	Agree	2.97	Agree
3.	Difficulty remembering	3.62	Agree	3.00	Agree
4.	Problems paying attention	3.62	Agree	3.00	Agree
5.	Trouble following directions	3.86	Agree	3.04	Agree
6.	Poor coordination	3.89	Agree	3.32	Agree
7.	Difficulty with concepts related to time	3.35	Agree	2.75	Agree
8.	Problems staying organized	3.67	Agree	3.12	Agree
9.	Impetuous behaviour	3.54	Agree	3.22	Agree
10.	Difficulty finding the right way to say something	3.37	Agree	3.17	Agree
11.	Difficulty listening well	3.37	Agree	3.00	Agree
12.	Problems dealing with new things in life	3.33	Agree	2.89	Agree
13.	Problems understanding words or concepts	3.49	Agree	2.59	Agree

Result in Table 2 showed that all the items presented to both male and female physics students had mean scores between 3.30 and 3.89 for male students and between 2.59 and 3.32 for female students. These scores are greater than 2.50 which is the mean value of the four point scale used for the study. The Table also showed that all the students both male and female agreed that all the thirteen items listed above are learning difficulties encountered by secondary school physics students in the study of physics.

Table 3: Chi Square perception scores of male and female physics students on the learning difficulties of secondary school physics students in the study of physics.

SEX	N	SA	A	D	SD	TOTAL
MALE	105	90 (77)	10 (22)	5 (3)	-	105
FEMALE	85	50 (63)	30 (18)	1 (3)	4 (2)	85
TOTAL	190	140	40	6	4	190

$$X^2_{cal} = 24.3, X^2_{crit/tab} = 7.815, df = 3.$$

Since $X^2_{cal} = 24.3$ and is greater than $X^2_{tab} = 7.82$, the hypothesis is rejected which means that a significant difference exists between the perception of male and female physics students on the learning difficulties of secondary school physics students in the study of physics.

Discussion

Tables 1 and 2 showed that all the items have mean values greater than 2.5 which means that all the students both males and females agreed that difficulty with reading and/or writing, problems with math skills, difficulty remembering, problems paying attention, trouble following directions, poor coordination, difficulty with concepts related to time, problems staying organized, impetuous behaviour, difficulty finding the right way to say something, difficulty listening well, problems dealing with new things in life and problems understanding words or concepts are secondary school physics students' learning difficulties in the study of physics. This result is in agreement with American Academy of Child and Adolescent Psychiatry (2011) who explained that learning difficulty is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities.

Supporting this, National Center for Learning Disabilities (2010) suggests that a learning difficulty is a processing disorder which could be based on a difficulty relaying messages from your head to your hand, for example, resulting in problems keeping up when taking notes in class. The student with a learning difficulty of this type may understand the ideas perfectly well but not be able to listen and write at the same time. This result is also in agreement with International Dyslexia Association (2008) who explained that learning disorders are diagnosed when the individual's achievement in reading, mathematics or written expression is substantially below that expected for age, schooling and level of intelligence.

Result in Table 3 indicated that there is a significant difference in the opinions of male and female students on these learning difficulties in the study of physics. This means that gender played a role.

Conclusion

The job of the teacher requires that he assists the learner to learn. The teacher can do this effectively by making the teaching environment stimulating, challenging and dynamic. The aim of teaching is not only to transmit information but also to transform passive students into active receptors of knowledge and constructor of their own knowledge. Students with learning difficulties have individual needs, and there may be great variation in academic accommodations for students with the same diagnosis. Unfortunately physics teachers do not put students' individual needs during the teaching of physics. Classroom accommodations must take into account maneuverability, and also a number of positioning, communication, and social factors that make learning easier for students in the classroom setting.

Recommendations

Based on the conclusion, the following recommendations are made:

- The physics teacher has to provide the students with a more focused reading list, where priority reading is highlighted, notes and/or handouts or lecture slides in advance of the lecture and encourage students to negotiate with other students regarding copying their lecture.
- Conferences, workshops, and seminars should be organized for the practicing and serving physics teachers to update their knowledge/ skills on how to help students with learning disabilities in physics.
- Physics students should be encouraged to be actively involved in the learning environment.
- Physics teachers must emphasize active teaching methods (e.g., group work, cooperative learning and presentations) and friendly classroom

environment that could initiate quality interactions between the students and the teachers in order to help students overcome their learning difficulties in physics.

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