EFFECTS OF PROBLEM SOLVING METHOD USING POWERPOINT ON STUDENTS ACHIEVEMENT IN PHYSICS

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Abstract
This study was designed to determine the effect of problem solving method with PowerPoint on SS II physics students' academic achievement refraction of light waves in Ilorin. Two research questions were answered and two null hypotheses tested. The study adopted a pretest, posttest, control group quasi experimental design. One hundred and twelve Physics students were purposively selected from three senior secondary schools in Ilorin. Achievement Test on Refraction of Light Waves (ATRLW). The data collected was analyzed using t-test. The revealed that the use problem solving method with power point and problem solving method with traditional approach enhanced SS II physics student academic achievement in refraction of light waves. There was no gender discrimination of the academic achievement of students taught with problem solving method using power point. The use of problem solving method with power point has an essential effect on male and female students. The study also revealed that problem solving method generally enhances students' ability in solving problem in physics. In conclusion problem solving method improves students' academic achievement in physics.
Key word: Problem solving, Power Point, Physics**,** refraction of light waves

Introduction
Physics is the center point to all science subjects based on its contribution to the development of science and technology that has improved the quality of life and human activities. The place of physics in science education, applied sciences, engineering and technology makes it highly important and imperative for science students to take the subject serious. Alukwo, Okereke and Ezekannagba (2000) defined physics as the mother of all science that deals with the composition and changes of matter. To be able to appreciate, control and effectively benefit and utilize our natural resources, it is important and imperative to acquire basic scientific knowledge as a basic tool for all forms of industrial and technological advancement of any nation.(American Physical Society 2014).

Nigeria and many nations of the world have recognized the importance of science and technology especially physics in its developmental endeavors (Bamigbala, 2006). This is because physics is the basic indexes in understanding the difficulties of modernize technologies (Ates & Eryilmaz, 2011). Students' academic achievement in physics in standardized examinations such as WAEC and NECO has consistently been on a decline. The WASSCE chief examiners report for May/June result 2009, indicated that candidate's population of 465,636 in physics recorded a standard deviation of 9.0 and an average score of 26 as against a standard deviation of 9.43. Kanno (2000) and Ajagun (2001) added that the performance of students' in science subjects especially physics has not been encouraging. This poor achievement of students in physics at secondary school level may have contributed to their perception of the subject as the toughest of the three conceptual sciences (Omole, 2008 & Cakirolgun, 2008). This development has attracted the attention of researchers, parents, guardians, the public and the Government .

Physics is perceived to be a difficult course or subject because of its abstract nature (Cheong, 2008). It is an intellectually demanding subject that requires good mathematical skills or sound mathematical foundation and strong practical knowledge for thorough understanding. As a central science subject, it exposes students' to knowledge ranging from mechanics, electricity, waves, radioactivity with emphasis on learning scientific laws, concept formati[1]on and practical experience in physics concepts. As such, it demands that appropriate and dynamic methods needed to be applied in teaching the subject . This will help to eliminate the fear and negative perception of students towards the subject. .

Researchers have underscored the relative effectiveness of adopting appropriate teaching methods in helping students to understand physics concepts, such as in mechanics, electricity, radioactivity, waves, optics and light to mention but few. Through the identification and development of appropriate teaching strategies the complexities and difficulties of understanding physics concepts among students can be removed. . Such strategies include demonstration, role play, experimentation, demonstration, problem solving, among others.

Problem solving method of teaching is also popularly known by educational scholars as problem based Instruction. The definition of problem based learning varies widely due to differences in practice and has appeared in various studies or review papers such as Gijbels etal (2005) and Prince (2004). Problem solving is comparative or identified with such terms like basic speculation, innovative thing, thinking, and choice making. In problem solving method, students are trained, using learning situations, to solve problems. The history of this method of teaching can be traced to John Dewey. Types of Problem Solving Method are the directed approach, the modified approach, the unrestricted approach.

The directed approach problem based method of learning is used by the teacher when the students are in experienced in the use of the method. The teacher takes control and directs the students' in all areas of the lesson. He initiates the topic the hypothesis, the collection and analysis of the data. He also guides the student to arrive at a generalization or solution to the given problem. The modified approach problem based learning is used by the teacher when the students are "catching up" with the method. They can handle some parts of the procedure. However, the teacher still serves, as a resources person. The unrestricted approach problem based learning is used by the teachers when the students' can handle the method on their own, they can formulate the topic and work on it on the making of the generalization that is providing solution to problem.

Procedures in Problem Solving Method

There are procedures that can be used in problem solving method of teaching. The inductive procedure and the deductive procedure. The inductive procedure enables students to provide solution to problem or establish generalization from observed cases. The inductive procedure considers the following; the study of the topic, finding out facts about the topic, detailing speculation, collecting and analyzing information, testing the theory against the aftereffect of the information investigation, drawing of conclusion, application of the conclusion to new situations and refined information; and meaningful speculations are then drawn for the deductive procedure, students are given laws to enable them solve a problem or to prove the correctness of the laws. Deductive procedure considers the following; the generalization is given, the generalization is applied in new situations and against new data, a conclusion is drawn.

Microsoft PowerPoint

Microsoft power point is a software application package use for presentation. The presentation of this research work is centered on problem solving method approach in teaching refraction of light in Physics and Microsoft power point is a helpful application to help this Method. The steps in designing this lesson are as follows: the slide for the presentation were made using the new slide icon from the home menu; the text box from insert menu box made it possible for the typing of letters and numbers; equation editor from Microsoft word made it possible to embed the formula for the refractive record of light; the shapes: Rectangle, Triangle, arrow and lines were all gotten from the insert menu using the auto shapes; colouring of the arrow and lines were done using the formatting bar for both the lines and arrow; and animation effect on arrow showing movement from dense to a less dense medium is done using the custom animation.

Statement of the Problem

The academic achievement of secondary school students' in physics examinations has been observed to be consistently poor and discouraging. This is evident in SSCE results of WAEC and NECO. . This has attracted increased attention of researchers, the government, general public and parents. Some have concluded that there is a fall in the standard of education in Nigeria. Scholars have identified inadequate qualified physics educators, lack of motivation, students' poor mathematical foundation and poor procedure of teaching physics as responsible for the poor achievement of students in Physics. The teaching of physics at secondary school level has been characterized with such approach as convectional lecture method, guided inquiry method and discussion method hap-hazardly delivered within 35 to 40 minutes relying on textbooks and rote memorization. This may have resulted to the poor performance in the subject.. Therefore, this study investigated the effect of problem solving method with power point on students' achievement in Physics Ilorin.

Purpose of the Study

The research was designed specifically to:

i. determine the effect of problem solving method with the use of power point on SS II students' academic achievement in Physics.
ii. determine the effect of problem solving method with use of power point on male and female SSII Physics students' academic achievement

Research Hypotheses

The following hypotheses were tasted in this study:

$H0_{1:}$ there will be no significant effect of treatment (problem solving method with power point and traditional problem solving method) on SS II students' academic achievement .

$H0_{2:}$ there will be no significant influence of gender on SS II students' academic achievement in Physics

Methodology

The study adopted quasi-experimental design in which pretest-posttest non-equivalent, non-randomized control group design. This was considered most suitable for the study because it establishes a cause and effective relationship between the independent and dependent variable of the study. Intact classes were used for this research based on the fact that it will not be possible to have a complete randomization of samples for the study without altering or disturbing the school curricular activities, non-curricular activities and other routine activities. The target population for this study was SSII physics students in Ilorin metropolis. Purposive sampling technique was used for the selection of the three (3) schools that participated in the study based on the fact that such schools had ICT centers called school net which was very suitable for carrying. . From a target population of four hundred and twenty-five (425) Physics students in senior secondary two (S.S.II), a sample size of one hundred and twelve (112) students made up of fifty-seven (57) males and fifty- five (55) females participated in the study. .

The instrument for this study is Achievement Test on Refraction of Light Waves (ATRLW) which consisted of Fifty (50) multiple choice objective questions adopted from past questions of West African examination council (WAEC), Joint admission Matriculation Board (JAMB), from and National examination council (NECO) from year 2010 to 2016. The instrument has validated by Physics experts and the test and measurement department of these aforementioned Examination Bodies. It was administered on thirty (30) physics students which were randomly drawn from senior secondary two (SSII) class comprising eighteen (18) males and twelve (12) females. The instrument was administered at an interval of two weeks in order to obtain two sets of score. A reliability coefficient of 0.785 was obtained using Pearson's moment correlation coefficient(r).A Pre-test item comprising of fifty (50) multiple choice objective questions on Refraction of light was administered for sixty (60) minutes to both the control and the experimental group under the supervision of the Researcher and the physics teachers of the respective schools in order to determine the student's prior knowledge on Refraction of light before the treatment was

introduced to experimental group and classroom teaching to control group. The answered scripts were collected from both groups. After the treatment and classroom teaching in three weeks a Post-test was administered comprising of the same fifty (50) questions randomly re-arranged to determine their new knowledge on Refraction of light. The answered scripts were collected from both the control and experimental group respectively; the scores from the test were recorded and processed statistically. The data were analyzed using mean and standard deviation. T-test was used to answer the hypotheses raised.

Results

$H0_1$: there will be no significant effect of treatment (problem solving method with power point and traditional problem solving method) on SS II students' academic achievement.

The pretest was carried out for the experimental and control group to find the correspondence i.e. entry level of the two group previous to the experiment happening. The pretest result of the control and experimental group is presented in table 1 below.

Table 1:
Pretest Table of Result

Group	N	df	Mean	S.D	t-value	P-value	Remark
Experimental	62		3.97	1.93			
		112			0.78	0.44	No Sig.
Control	50		3.68	1.85			

From Table 1 above the t-value of 0.78 was found to be at 0.05 level of significances $p>0.05$, it means that there are no significant differences in the pretest mean achievement of the control and experimental group. This entails that the group are comparatively equivalent in terms of entry level or mode academically for the study. It implies that no group has comparative advantage over the other academically for this investigation.

To test this speculation, the posttest academic mean accomplishments of the test control gathering were figured measurably utilizing dependent sample t-test. Tables 2.presents the results below.

Table 2:
Post-test Table of Result

Group	N	df	Mean(X)	S.D	t-value	P-value	Remark
Experimental	62		32.89	5.17			
		112			0.00	0.99	No Sig.
Control	50		32.89	4.63			

From Table 2 above the t-value of 0.00 was found to be at 0.05 level of significance. Since $p>0.05$, it indicates that there is no huge differences between the average achievement of the experimental group (32.89) and the mean achievement of the control group (32.89). Therefore, hypothesis 1 (Ho_1) is accepted.

Hypothesis 2

Ho_2: there will be no significant influence of gender on SS II students' academic achievement in Physics.

To test this hypothesis, the posttest academic average achievement of the experimental group was computed statistically using independent sample t-test. Tables 3, presents the results below.

Table 3

Gender Differences in Students Achievement in Physics

Gender	N	df	Mean(X)	S.D	t-value	P-value	Remark
Male	35		33.80	5.30			
		62			1.43	0.16	No Sig
Female	27		32.10	4.99			

From Table 3 above the t-value of 1.43 was found to be significant at 0.05 level. Since $p>0.05$, it indicates that there are no noteworthy contrasts between the mean academic achievement of male students' (33.80) and female students' (32.10). Therefore, hypothesis 2 (Ho_2) is accepted.

Discussion of Results

The aim of the study was to investigate the effect of problem solving method with Power Point on SS II physics students' achievement with a specific end goal to do this examination work two (2) exploration inquiries were defined and tried.

This result revealed that there was no huge significant difference in the achievement of student taught refraction of light waves using problem solving method with PowerPoint and animation and student taught refraction of light waves using problem solving method with traditional approach. From the above findings, it can be deduced that student taught refraction of light waves using problem solving method with PowerPoint did not perform better than student taught refraction of light waves using problem solving method with traditional approach. Thus it therefore means that the using of problem solving method have enhancing positive effect on teaching refraction of light waves using Power Point and using the traditional approach. The result from the study is in agreement with the findings of (Akinoglu and Tandogun, 2007) who stated that the implementation of problem based active learning model had positively affected student academic achievement towards science course. This result is in contrast with the result of Sahin (2007) which revealed that students' expectation deteriorated rather than improving in material science (physics) and material science (physics) learning in problem based learning class as an aftereffect of one semester of guideline.

From this result, there is no significant difference in the mean achievement scores of male and female students' taught Physics using problem solving method with PowerPoint. Thus it therefore means that the use of problem solving method with power point has an enhancing positive effect on both male and female students' in the experimental group hence there was no gender discrimination in terms of their academic r achievement .

Conclusion

The study concluded that the use of problem solving method with PowerPoint in teaching and learning of Physics is effective as indicated by the mean scores of students in the experimental group. The findings also revealed that the use of problem solving method with traditional approach is effective as indicated by the mean scores of students in the control group. It was also concluded that there was no gender discrimination in terms of academic achievement in the use of problem solving method with power point in teaching Physics. Thus it can be concluded that achievement is a function of cognitive ability and not gender. Gender was found not to be a significant factor that determines achievement in Physics. Therefore, it is concluded that problem solving method of teaching generally improves students' problem solving ability in physics.

Recommendations

Based on the findings, the following recommendation were made by the researcher

i. Problem solving method generally should be utilized in teaching areas in physics that involves a lot of calculations.
ii. Problem solving method should be applied by Physics teacher during corrective evaluation of students'
iii. Problem solving enhances students question and answering skills.

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