Effect of Thematic Teaching Strategy on Secondary School Physics Students' Achievement in Ilorin, Kwara State.

Abdulwaheed Opeyemi IBRAHIM
Department of Science Education
Faculty of Education, Prince Audu Abubakar University, Anyigba
E-mail: oabdulwaheed9@gmail.com

Abstract
This study determined the effect of thematic teaching strategy on secondary school physics Students' achievementin Ilorin Kwara State, Nigeria. Quasi-experimental design was adopted for the study. The sample size for the study comprised of 258SSII Physics Students from four co-educational secondary schools that were purposively selected from one of the three senatorial zone in Kwara State. The topics were taught based on thematic teaching strategy. The data were collected using Physics Achievement Test (PAT). Pearson Product Moment Correlation (PPMC) formula was used to determined reliability coefficient and a value of 0.86 coefficient was obtained. Mean,standard deviation, analysis of variance and analysis of covariance (ANCOVA) were used for data analysis. The finding of the study indicates that, experimental groupperform better than those in control group among others. It was recommended that, thematic mode of teaching strategyshould be include to secondary school curriculum and syllabus.
Key words: Thematic teaching strategy, Physics, Gender, Achievement

Introduction

The teaching learning process is aimed at students' achievement, this is in term of grades or performance as a sole measure of learning in many cases. To actualize this motive, many educators have conducted researches on the use of different teaching strategies, include the Guided discovery, Analogy, JIGSAW, Vee mapping, Concept mapping, Cooperative learning among others (Joseph*et al.,* 2015) but the problem is yet to be solve. Studies have been conducted by researchers like Abdulwaheed, and Achimugu 2022; Joseph*et al.,* 2015 to find solutions to students' low achievement in Physics and also exploring different innovative approaches and instructional strategies of teaching to enhance teaching and learning of science in general and Physics in particular in secondary schools in Nigeria. One of these teaching strategies is thematic teaching strategy.

Thematic teaching strategy involves manipulation of tools, materials and accurate measurement, accurate recording of observations, analyzing of result and drawing inferences is urgently needed. It also involves exchange of ideas and provides answers to questions asked by the students. In an attempt to find solution to the students' lowachievement in Physics.Thematic teaching is one of the teaching strategies that use themes toward creating an active, interesting and meaningful learning. Thematic teaching strategy allows the teacher to organize topics around macro themes that emphasize interrelatedness and multidisciplinary approach irrespective of subject boundaries (Amukushu-Niipare, 2017).

In other words, thematic teaching Strategy refers to an integrated method of teaching that allows for multidisciplinary approach and organization of topics around theme without subject boundaries. It could make the teacher a facilitator, motivator and guide. Here the students are made to see school subjects as connected and interrelated. Thematic instruction provides an effective way to contextualized instruction. It incorporates a concrete learning by-doing orientation and has the potential to facilitate corporative and interactive learning opportunities in the classroom (Min*et al.,* 2012)also noted that the advantages of using a thematic approach to curriculum design is that it encourages the teachers to start with students' strength and utilize their relevant background knowledge. Traditionally, teaching activities are always followed in chapters of textbooks. Under this circumstance students easily have a passive attitude towards learning.The students may not really understandwhat they havebeentaught and are even more unlikely to apply this knowledge in their real-life experiences.Shapiro *et al*., (2017) revealed that thematic instruction increases students' achievement.Thematic instruction not only organizes activities or lessons around a general idea or theme meaningful to the learner, but also, students will engage in self-directed learning through the guide, cooperation, and exploring mode of learning (Lesley & Mathews, 2018).

Thematic strategic method of teaching can be practiced in many forms, these includes: demonstration method, group work, out of classroom learning, use of presents students with examples of published studies (Clark& Braun 2013). Themes allow for the use of many different resources at varying degree or difficult, so that all students can

participate. Besides that, themes provide context for real-reading and writing activities, scientific investigations, and inquires in variety of subject areas. Furthermore, a thematic curriculum provides students with opportunities for independent learning, problem solving, divergent thinking and risk- taking (Min*et al.,* 2012).

Kindergarten teachers had a positive perception towards implementation of thematic approach in the teaching and learning process (Mureithi, 2013). Thematic unit instruction is able to improve University Technology Students' reading and writing abilities. The improvement came about as a result of a more focused, meaningful and authentic learning experience. Students not only became more engaged and motivated, but their character was also positively shaped. They also indicated that planning thematic unit should allow for incorporation of a variety of language concepts into topic area that is interesting and worth studying which gives students a reason to use the language. Teachers should choose themes that lend themselves to teaching language that will be useful for their students they would switch-off and then it would be difficult to recover their attention in class. Most teachers expressed that a procedural instruction approach based on rules and formulae was the most suitable one for instilling mathematical abilities in students. Colasanti and Follo (2002) suggested that a theme study will not be successful unless the teacher is able to communicate to the students what they are learning, why they are learning it, and most importantly, how it fits into larger scheme of their education and their lives. Teacher should help students' make connection between different areas of knowledge that makes a theme come to life in the classroom. The teachers' ratings of overall thematic experience were very positive. Teacher indicates a willingness to engage in a similar teaching unit in the future (Mishra & Koehler, 2016). Thematic instruction is characterized by arrangement of distinct strategies. Teachers who incorporate thematic instruction employ research-based strategies such as:

1. Choose authentic themes that matter. Choosing themes that are authentic content connectors strengthens students' ability to build fluency between school subjects and apply them in real-world contexts. Select concepts or ideas that will blend disciplines and create bridges to new knowledge.
2. Employ cooperative grouping. Using small, cooperative learning groups to support problem solving and cooperation.
3. Design inquiry-based learning experiences. Designing lands –on, "minds-on" activities help students make real-world sense of concepts by applying what they are learning.
4. Create a resource - rich classroom. Provide a rich environment for exploring the theme in multiple avenues. Computers connected to the internet, magazines materials to experiment with, and tools for creating records of learning all enable elaboration of new knowledge.
5. Connect to the local surroundings. Extend the classroom into the neighborhood, town, and environment by integrating them into the curriculum in meaningful ways.
6. Team with others. Collaborate with colleagues to bring good ideas into the planning process and create strong links to other disciplines by sharing content expertise.
7. Provide timely feedback. The real world provides authentic feedback, allowing us to internalize what success or failure looks and feels like. Feedback in the classroom should replicate authentic learning situations by being timely and instructive.
8. Link assessment to real-world achievements. Use authentic achievement assessment that asks students to apply what they understand in new ways.
9. Use technology effectively. Employ appropriate technology tools for students to explore ideas, engage in simulations, and make new connections.

Thematic teaching strategy has been used by many researchers as instruction strategy with positive and improved results. A study conducted by Min *et al.* (2012) on Teachers' Understanding and Practice towards thematic approach in Teaching Integrated Living skills (ILS) in Malaysia. The researcher reported that, the Integrated Living Skills teachers' understanding level towards thematic approach is high. Similarly, Ebele (2015) investigated the 'effect of thematic instructional strategy on secondary school students' achievement in selected Science concepts using quasi-experimental research design that made use of pre-test, post-test and control group. The study revealed that the use of Thematic Instructional Strategy in teaching Science concepts improved students' achievement in science than lecture method. It also showed that Thematic Instructional strategy enhanced the achievement of both male and female students by equal margin. Similarly, Chen (2015) investigated a study on integrating thematic instructional strategy and modularity concept into the video-based instructional material, study revealed that the interactive thematic video could promote students more engaged and acquired more information and remembered more ideas. Also Okoro and Okoro (2016) determined teachers' understanding and practice towards thematic approach in teaching and learning of

social studies in Rivers State using descriptive survey method. the study revealed that teachers' understanding of thematic approach in teaching social studies is not sufficient; teachers do not have adequate thematic practice approach in teaching social studies; and that teachers' years of experience is not a determinant factor for teachers' utilization of thematic instruction in teaching social studies. The unique of this study is that, from the aforementioned studies it was found that thematic teaching strategy have not been conducted on Physics as a subject.

Studies on gender difference and academic achievement have led to a number of conflicting results. While some find gender as important factor in academic achievement, others found no differences between both genders in their achievement. According to Okeke (2015), the concept of gender was elaborated and popularized in the 1970 to differentiate between those characteristics of men and women which are socially or culturally determined (such as cooking, mending of spoilt appliances at home) in contrast to those which are biological determined and applied to sex and which cannot be leaned and do not change with time or culture (impregnation, childbearing and breas tfeeding). Gender characteristics, though learned, have lasting and far-reaching implication for science teaching. They lead to gender differences in access to participation and achievement in science subjects and related careers. These differences include; school enrolment especially in the physical sciences and engineering in favour of males; achievement in science related subjects at all levels of education in favour of males; access to science and technology related career especially in engineering field oil companies in favour of males.

The theory associated with thematic teaching strategy is experiential learning. Experiential learning focuses on the learning process for the individual. The cycle comprises four different stages of learning from experience and can be entered at any point but all stages must be followed in sequence for successful learning to take place. The learning cycle suggests that it is not sufficient to have an experience in order to learn. It is necessary to reflect on the experience to make generalizations and formulate concepts which can then be applied to new situations. This learning must then be tested out in new situations. The learner must make the link between the theory and action by planning, acting out reflecting and relating it back to the theory. One of the examples of experiential learning is going to the zoo to learn through observation and interaction with the zoo environment, as opposed to reading about animal from a book. These enable one to have first- hand knowledge and make a lot of discovery.

The study was necessitated by the declining level of students' achievement in Physics. This under achievement was attributed to wrong use of teaching approaches in Physics (Ebele 2015). This ineffective teaching and learning also causes problem not to students but to parents, teachers and our Nation. There is need to explore more suitable teaching method and instructional strategy that will enhance students' achievement in Physics. The strategies considered by the researcher which may salvage the problem if use is thematic teaching strategies. It is in light of this, that the study investigates the effect of thematic teaching strategy on secondary school students' achievement in Physics in Niger State.

Purpose of the study

The purpose of the study is to determinethe effects thematic teaching strategy on secondary school Physics students' achievement in Physics in Ilorin Kwara State, Nigeria. The specific objectives are as follows:

i. To determine the mean difference in achievement of students taught Physics using thematic teaching method and those taught using conventional lecture method.
ii. To determine the difference inachievement of male and femalestudents taught Physicsusing thematic teaching method.

Research Questions

In an attempt to address the problem, the following research questions were answered.

i. What is the mean difference in achievement of students taught Physics using thematic teaching method and those taught using conventional lecture method?
ii. What is the differences in achievement of maleand female students taught Physics using thematic teaching method?

Research Hypotheses

Based on the above questions, the following hypotheses were tested:

$H0_1$: There is no significant difference in achievement of students taught Physics using thematic teaching method and those taught using conventional lecture method

$H0_2$: There is no significant difference in achievement of male and female students taught Physics using thematic teaching method.

Methodology

The research design adopted for this study was a quasi-experimental design.A non-equivalent pretest-posttest and control group design was used. The design establishes cause-effect relationship between two variables, the independent and dependent variables of the study (Nekang and Agwagah, 2010). This design was adopted because it was not possible to randomize the subject of the study without disrupting the academic programmes of the schools. The participating schools were purposively selected because of gender as moderating variable and categorized into experimental group which was subjected to treatment using thematic teaching strategy while the control group was subjected to conventional lecture method. Similarly, intact classes selected in the sampled schools were used for the study. The targeted population of this study comprised of the entire population of SS II students in all the three hundred and seventy-four (374) Senior Secondary Schools in Kwara State. The total population of the students in all these schools is five thousand three hundred forty (5,340) in 2021/2022 session. The choice of SS II was based on the fact that the concept falls under their syllabus and scheme of work and were not preparing for any external examination that would have experimental effect on the research result. A multi stage sampling techniques was used for the study. The study was carried out in four (4) selected co-educational senior secondary schools in Ilorin drawn through random sampling. Two (2) schools were assigned to be experimental group (thematic) and two (2) schools were assigned to and control group (conventional method).

The test instrument that was used for this study was Physics Achievement Test (PAT).The PAT Consisted of fifty (50) objective items developed from the concepts that were taught, it was made up of five options (A-E) with one correct answer. This was developed by the researcher based on the items covered during teaching Physics classes and assignment. The test was in two sections in which the students are expected to respond to, these includes; section A (Bio data Section) designed to obtain information on students' school, class, gender, subject and date on which test was administered. The PAT was used to obtained data on students' achievement after the treatments. The test was designed to measure the six levels of cognitive domains of the students according to Bloom's Taxonomy of Education Objectives. The number of items measuring each domain level. The questions and marking schemes (Objectives answers) were subjected to experts' validation and scrutiny by two Professors and two senior lecturers in both Science Education Department and Physics Department, their suggestions were considered for final draft of the instrument. The reliability coefficient was determined using Test-retest method. The first test was administered to the students and collected. After a period of two weeks the same test was administered to the same group of students. The two scores were collated and analyzed using Pearson Product Moment Correlation (PPMC) formula and a value of 0.86 coefficient was obtained. The experimental study lasted for four weeks. Descriptive statistics of Mean and Standard deviation were used to analyze the research questions while inferential statistics which encompasses Analysis of Variance (ANOVA) and Analysis of Covariance (ANCOVA) were used to analyze the hypothesis. The significance of the various statistical analysis was ascertained at 0.05 alpha levels.

Results

Table 1: Summary of ANOVA result of the pretest scores of Experimental Group and the Control Group

Source of Variation	Sum of Square	df	Mean Square	F cal	P value
Between Groups	7.476	1	3.738	0.293	0.746^{ns}
Within Groups	5964.863	256	12.738		
Total	5952.340	258			

NS: Not Significant at$P>0.05$ alpha level

Table 1 shows the ANOVA comparison of pretest scores of Experimental Group and the Control Group. An examination of the Table shows that there is no significant difference in the pretest scores of the two groups with the df = (2,256) P-value of 0.746 ($p > 0.05$). This implies that the two groups had similar entry behaviour before treatment was administered.

Research Question one: What is the mean difference in achievement of student's taught Physics using thematic teaching method and those taught using conventional lecture method?

Table 2: Mean and Standard Deviation of Pre-test and Post-test Scores of Experimental group and control Groups

Group	N	Pre-test		Post-test		Mean Difference
		$\bar{X}$	SD	$\bar{X}$	SD	
Thematic	127	23.45	3.29	32.34	2.87	8.89
Lecture	131	23.48	3.66	27.33	2.72	3.85

Table 2 shows the mean and standard deviation of scores of students taught Physics using thematic teaching strategy in Experimental Group and those taught with lecture method in the Control Group at pre-test and post-test. From the Table 2, it was observed that the mean scores of the two groups at post-test differ, where students taught through thematic teaching strategy had higher mean scores of 32.34 with standard deviation of 2.87 while those taught through lecture method had mean scores of 27.33 with standard deviation of 2.72.

Research Question Two: What is the differences in achievement of male and female students taught Physics using thematic teaching strategy?

Table 3: Mean and Standard Deviation of Pretest and Post-test Scores of Males and Females in Experimental Group

Group	N	Pre-test		Post-test		Mean Difference
		$\bar{X}$	SD	$\bar{X}$	SD	
Male	72	23.45	3.74	32.33	3.05	8.88
Female	55	23.44	1.90	32.39	2.44	8.95

Table 3 shows the mean and standard deviation of scores of male and female students taught Physics using thematic teaching strategy in Experimental Group at pre-test and post-test. From the Table 3, it was observed that the mean scores of the two groups at post-test differ, where female students had higher mean scores of 32.39 with standard deviation of 2.44 while their male counterparts had mean scores of 32.33 with standard deviation of 3.05.

Hypotheses

$H0_1$: There is no significant difference in achievement of students taught Physics using thematic teaching method and those taught using conventional lecture method.

Table 4: Summary of Analysis of covariance (ANCOVA) on Achievement Scores of the Experimental and Control Group.

Source	Type III Sum of Squares	Df	Mean Squre	F-Cal.	Sig	Decision
Correctional Model	1057.637	4	164.409	19.246	0.000	
Intercept	908.428	1	908.482	91.548	0.000	
Pretest	5964.863	1	5964.863	52.533	0.000	
Group	5952.340	1	5952.340	65.419	0.000	S
Gender	0.616	1	0.616	0.068	0.795	
Group	18.613	1	18.613	3.811	0.095	NS
Error	939.688	253	9.041			
Total	35903.000	258				
Corrected Total	1897.325	257				

*: Significant at p <0.05 level

Table 4 revealed F-value = 65.419, p = 0.00. The hypothesis one (HO_1) was not accepted, because p-value is less than 0.05. This implies that there is significant difference between the mean achievement scores of secondary school students taught Physics using thematic teaching and those taught using conventional method.

Hypothesis Two: There is no significant difference in the mean achievement scores of male and female secondary school students taught Physics using thematic teaching strategy.

In Table 4, the calculated F- value for gender was 3.811, p = 0.095. the hypothesis two was accepted, because p- value is greater than 0.05. this implies that There is no significant difference in the mean achievement scores of male and female secondary school students taught Physics using thematic teaching strategy.

Discussion of Findings

The purpose of the study was to determine the Effect of Thematic Teaching strategy on Secondary School Physics Students' Achievement in Ilorin, Kwara State. Findings of the analysis on the Physics students' achievement taught Physics using the matic teaching method and those taught with conventional lecture method in the present study indicated that there were significantly higher achievement scores of students taught Physics using thematic teaching method than those taught using conventional lecture method. As a result of the null hypothesis which states that there is no significant difference in the achievement of students taught Physics using thematic teaching method and those taught using conventional lecture method was not accepted. The result is in agreement with the findings of Ebele (2015) who observed that the use of thematic instructional strategy in teaching Sciences improved students' achievement in science than lecture method. The analysis of the achievement of male and female students taught Physics with thematic teaching method revealed that there was no significant difference in the mean achievement scores of students taught using thematic teaching method. As a result of the null hypothesis which states that there is no significant difference in achievement of male and female Physics students taught using thematic teaching strategy was not accepted. This is contradicting the result of study by Ebele (2015), who revealed that there was significant difference in the achievement of both male and female students taught Science using the thematic teaching methods. It was also in agreement with the study of Sabiru (2014) and Ali (2013) who reveal that male students tend to achieve higher than female students when expose to instructional strategy.

Conclusion

Based on the aforementioned findings of the research work, it is concluded that; the thematic teaching methods had improved learners' achievement in Physics more than the conventional teaching method. The male and female students taught using thematic teaching strategy had achieved equally well in Physics. It is hereby deduced from this study that thematic teaching strategy are much more effective than conventional lecture method in enhancing student's

achievement in Physics.

Recommendations

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

1. Government should encourage the use of thematic teaching method in the teaching and learning of Physics and other subjects in secondary schools by organizing workshops and seminars in training and retraining of teachers on the use of the aforementioned teaching methods.
2. Secondary school curriculum and syllabus should be developed by experts in Physics considering the thematic mode of teaching strategy.
3. Secondary school administrators should organize workshops, conferences and seminars to expose Physics teachers on the use of thematic mode of instruction to improve teaching and learning process in the classroom.

References

Abdulwaheed, O. I. &Achimugu, L. (2022). *Effect of flipped classroom instruction on secondary school physics Students' achievement and interest amid Covid-19 pandemic in Ilorin Kwara State, Nigeri. Africa Journal of Science, Technology and Mathematics Education 8(4) 291 – 296.*

Ali, A. (2013). Nigeria scientists and science teachers'educators perception and products of science. *Journal Science Teacher Education Association of Nigeria,* 24(2), 134-142.

Amukushu-Niipare, A. (2017). Investigation of the implementation of the thematic approach in Namibian lower primary classrooms: A case study. A Master's Thesis, Department of Education, **Rhodes University Department of Education.**

Chen, Y. T. (2015). The effect of thematic video-based instruction on learning and motivation in e-learning. *International Journal of Physical Sciences*, *7*(6), 957-965.

Clark, L. H. &BraunS. (2013). Secondary and middle school teaching methods. New York, McMillian Publishing: 34-58.

Colasanti, A. M., & Follo, E. (2002). Effectiveness of thematic teaching in curriculum design and implementation in a third grade classroom, including a planning process model using the Michigan model core curriculum.

Ebele, F. U. (2015). Effect of thematic instructional strategy on secondary school students' achievement in selected Science concepts. An unpublished PhD thesis of the Department of Science Education, University of Abuja.

Joseph, P. M., Olayiwola M.A., Njoku S., & Mohammed U. (2015). *STAN Chemistry for Senior Secondary School*. New Edition. HEBN Publishers.

Lesley, M., & Matthews, M. (2018). Place-based essay writing and content area literacy instruction for preservice secondary teachers. *Journal of Adolescent & Adult Literacy*, *52*(6), 523-533.

Min, K. C., Rashid, A. M., & Nazri, M. I. (2012). Teachers Understanding and Practice Towards Thematic Approach In Teaching Integrated Living Skills (ils) In Malaysia. *International Journal of Humanities and Social Science*, *2*(23), 273-281.

Mishra, P., & Koehler, M. (2016). Technological pedagogical content knowledge: A framework for teacher knowledge. *The Teachers College Record*, *108*(6), 1017-1054.

Mureithi, J. W. (2013). *Factors Influencing Learners' Transition From Preschool To Primary School. A Case of Public Schools in Thika-west District, Kiambu County-Kenya,* Doctoral dissertation, University of Nairobi.

Nekang, F. N., & Agwagah, U. N. V. (2010). Effect of concept mapping on student's achievement and interest in elementary probability in Cameroon. *Journal of Education and Leadership Development, 2*(4), 75-82.

Okeke, E. A. C. (2015). Women in science technology and mathematics education in Nigeria, in Busari (ed), 42nd Annual conference Proceeding of STAN. Hainneman Educational Books sPlc.

Okoro, C.O., & Okoro, C.U. (2016).Teachers' understanding and use of thematic approach in teaching and learning of social studies in rivers state. *International Journal of Education, Learning and Development*, *4*(3), 64-69.

Sabiru, D.Y. (2014). Effect of collaborative learning on chemistry students' academic achievement and anxiety level in balancing chemical equation in secondary school in Katsina Metropolis, Nigeria. *Journal of Education and Vocational Research,* 5(2), 43-48

Shapiro, P.J., Brown, P.L., Hageneberger, J.M. (2017). Project Deltal: Improving student learning through interactive course design. 27th Annual Conference on Distance Teaching & Learning.