PERCEPTION AND SATISFACTION IN LESSON STUDY AMONG SECONDARY SCHOOL PHYSICS STUDENTS BASED ON LEARNING PATTERN IN FEDERAL CAPITAL TERRITORY ABUJA

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Abstract
This study investigated the perception and satisfaction in Lesson Study among secondary school physics students based on learning pattern in Federal Capital Territory (FCT) Abuja. Descriptive survey was research design adopted. The researcher used random sampling to select three Area Council out of six Area Council in the Federal Capital Territory Abuja. From the 1848 target population of students in science and technical colleges in FCT, the researcher used a Simple random sampling technique to sample 317 students from the three co-educational science and technical colleges for this study. Two different questionnaires of five- point Likert scale with the reliability coefficient of 0.98 for students learning pattern questionnaire (SLPQ) and 0.82 for perception and satisfaction of physics students on lesson study questionnaire (PSPSLSQ) were administered to the sampled population. And to guide the study, two research questions and two research Hypotheses were raised. The data collected were analyzed using frequency counts, Mean, Standard Deviation and ANOVA. The findings from this study revealed that visual, social and logical learning pattern of Physics students have positive perception on lesson study method, there was no significant difference in the response on perception and satisfaction level of students based on visual, social and logical learning pattern. It was recommended among others that Lesson Study should be adopted by FCT school principals and teachers to improve students' perception and satisfaction. Both the Federal and State governments should implement lesson study in all the secondary school in Nigeria.

Keywords: Lesson Study, Learning pattern, Perception, Physics, Satisfaction

Introduction

Physics is a foundational science whose discoveries have never ceased to be the propelling engine of technological advancement (Nigeria Education Research and Development Council, 2013). The structure of the evolution of universe has provided insight into fundamental forces of nature which is controlled by the understanding of physics. In the light of this we need physics (science) education. It is expedient that useful method of teaching and learning foundation is laid for positive perception, and satisfaction in the study of physics.

There are different teaching methods employed in science education in secondary schools such as lecture method, demonstration method and so on. Miles (2015) asserted that it is expected of a teacher to implement a range of instructional strategies that will bring a better learning to all science students. For any method to be able to bring a positive perception and satisfaction in the present age, it should be a method that promote maximum social interaction. Social interaction between students and between teacher and student plays a crucial role (Nguyen & Williams 2012). Teaching methodology is crucial in the construction of knowledge and the method adopted by teachers can promote the construction of knowledge or hinder it. What may discourage initiatives and curiosity of learners, therefore the need for constructivist- based teaching and learning strategy and application of Lesson study is one of the methods.

Lesson Study is defined as professional development that offers continuity, collaboration, and refinement to enhance teachers' knowledge and skills in order to facilitate students' learning (Harsono, 2016). Lesson study in a Japanese teaching and learning environment, teachers work in small teams to plan, teach, observe, analyze and refine individual class lessons, called research lessons. Nearly all Japanese teachers participate in a lesson study team during a school year. In addition, the teachers observe lesson study regularly in the school and at schools that host lesson study open houses. Lessons study are published and widely disseminated throughout the Japanese. Is a broad-based, teacher-led system for improvement of teaching and learning. Lesson study involves a small team of instructors working together to design, teach, study and refine a single class lesson. Lesson Study is a process of improving teaching and learning, not only for students but also for teachers, which originally appeared in Japan (Giannakidou, Yoftsali, & Tziora, 2013).

Lesson Study method aims at creating structured occasions for teachers to examine teaching and learning (Haithcock, 2010). Dudley (2011) indicated that lesson study is a systematic attempt to achieve an educational objective that involves repeated opportunities to plan, observe, evaluate and discuss student learning in close detail. Lesson study was initially used in Japan and benefits from this approach have contributed to the strong record of achievement level in students. In addition, Dudley (2011) stated that having goal of becoming more effective, teachers used lesson study as their professional development in order to be engaged and able to examine their practices systematically.

Lesson Study involves not only lesson planning and teaching a lesson but also observing and critiquing the lesson being observed by several teachers working collaboratively. The teachers involved will select an overarching goal and related research question that they want to investigate, and this will provide as their focus and direction to their work. The teachers will jointly work on a detailed lesson plan and one of the teachers will teach the lesson while others will observe the lesson. After the lesson, all the teachers will discuss about their observation and this often led to a better revision of plans where another teacher will then implement into a second lesson while the rest observe the lesson. Then, discussion will take place and this cycle can repeat up to 3 or 4 lessons and eventually the teachers will make a report on this professional development process in answering their chosen research question.

Lesson Study seems not popular among the teeming population of Nigeria Educators, especially in the Federal Capital Territory (FCT) Abuja. This view came up as result of the Conference on Higher Education transformation, organized by the National University Commission (NUC) in collaboration with the University of Sussex, UK, at Nile University, Abuja (2017) were only about 5% of 120 workshop participants had heard about Lesson Study before the conference and none of the 5% were using it. This view also came up as result of the AUDA NEPAD STEM Education project capacity strengthening workshop for FCT In-service teachers and lecturers of the University of Abuja held from 26th – 28th November 2019, at the Hawthorn Suites, Garki Abuja, out of 160 workshop participants no one is using Lesson Study.

The aspect of physics focused in this study is heat and temperature. This is because The WEAC chief examiner report have constantly raised issues of student's poor performance in questions under Heat and Temperature physics especially specific heat capacity and specific latent heat over a decade now. It has often branded heat questions as unpopular and students who answer the question perform poorly both in essay and practical (WEAC, 2011-2018).

Learning pattern is conceptualized as a coherent whole of learning activities that learners usually employ, student's beliefs about learning and learning motivation, a whole that is characteristic of students in a certain period. It is a coordinating concept, in which the interrelationships between cognitive, affective, and regulative learning activities, beliefs about learning, and leaning motivation are united. It is a development that prompted psychologists, Sara (2010). Sara (2010) maintained that a person's learning style may be equated with learner's characteristic way of thinking or approaching a problem. Sara (2010) added that, while an individual's learning style remained stable over the years, the individual strategy may vary from one situation to another.

Visual (Spatial) Learning Style is a style in which a learner utilizes graphs, charts, maps and diagrams. It also involves Sight; emphasis on seeing, watching, viewing, drawing. Visual learners think in pictures and learn best in visual images. They depend on the instructors or facilitators non-verbal cues such as body language to help with understanding. Sometimes, visual learners favor sitting in the front of the classroom. They also take descriptive note of other materials being presented.

Social (Interpersonal) Learning style are the students who love to make learning interesting by engaging in group activities or by interacting with other people. Interpersonal learners are the individuals that seem to be involved in every extracurricular activity. This group of learners like to be engaged with others, work in teams and ask their peers for feedback in order to learn.

Logical (Mathematical) Learning Style learner thinks deductively; deals with numbers and recognizes abstract patterns. Most logical thinkers end up being engineers, mathematicians or pursuing the sciences. This is because they have a unique way of learning. Logical learning are individuals who want to understand the reason behind instructional content or skills (Cheyenne, 2019)

Perception of students on learning is a personal interpretation of information from their own perspective. The influence of school on students learning outcome is derived from a student's individual perception rather than the objective reality of the activities and intervention. The focus of this work is on investigating the way students think about the new learning method introduced to them. Perceived learning is the extent to which a certain level of knowledge obtained on the new learning recognized by students (Lewis 2011). Perceived learning is a change in the learner's perceptions of skill and knowledge levels before and after the learning experience. Satisfaction refers to the favorability of a student's subjective evaluations of the various outcomes and experiences associated with education. As satisfaction is based on experience, student satisfaction is constantly being influenced by the students' overall experiences. In order to make the institutions more efficient and effective, the students' expectations and motivation, academic preferences and perceptions about quality of the institutions' environment or atmosphere and their learning outcome should be kept higher by the managements of the institutions, (Hassan, 2013). Students particularly at secondary level, need more high-quality services and facilities for study at high level education because high quality of services at this level satisfied their esteem and develops them with all the essentials and capabilities to be an effective education personality.

Studies were conducted using lesson study in physics but focus on teachers and not students and it was done outside Nigeria. A study was also conducted on lesson study in basic science and technology in Nigeria but not in FCT and also focus on teachers. Studies was also employed on lesson study to teach year 9 students the topic pressure in physics outside Nigeria and not on heat and temperature. Majority of these studies was done

outside Nigeria and did not focus the concept of heat and temperature in physics. Therefore, there seem to be limited studies using lesson study in Nigeria, especially in Federal Capital Territory Abuja, despite the potential of this approach to enhance learning. Hence the need for this study.

Research Questions

Answer to the following research questions would be pursued in the study

(i) What is the perception based on virtual, social and logical learning pattern of physics students taught heat and temperature on lesson study method in FCT Abuja?

(ii) What is the satisfaction based on virtual, social and logical learning pattern of physics students taught heat and temperature on lesson study method in FCT Abuja?

Null Hypotheses

Null hypotheses were formulated for this study and tested at 0.05 level of the confidence

HO_1: There is no significant difference in the perception based on virtual, social and logical learning pattern of physics students taught heat and temperature using lesson method in FCT Abuja.

Ho_2: There is no significant difference in the satisfaction based on virtual, social and logical learning pattern of physics students taught heat and temperature using lesson method in FCT Abuja.

Methodology

The study employed descriptive survey design. This enables the researcher to generate information from a representative sample of the larger population so as to draw conclusions that are valid. The entire population of the study consisted students offering physics in Science and Technical Collages, Federal Capital Territory Abuja. The total number of co-educational government Science and Technical Schools in FCT, Abuja is 5 with total of 5086 senior secondary school students offering physics (Department for Science and Technology, FCT Abuja). 2953 are male students while 2133 are female students who studied physics in 2019/2020 academic session.

The targeted population for this study is the whole year two (II) students of the senior secondary school, in the five science and technical colleges in FCT Abuja offering physics in 2019/ 2020 academics session. The total target population is 1848 in which 740 students are female and 1108 students are male (Department for Science and Technology, FCT Abuja. 2019). The researcher used random sampling to select three area council out of six area council in the Federal Capital Territory Abuja. From the 1848 target population of students in science and technical colleges in FCT, the researcher sampled a total 3I7students from the total of three co-educational science and technical colleges for this study. This is in line with Krejcier and Morgan (1971) table for determining sample size. Stratified sampling technique was used to categorize the schools based on the type of student enrolled. Purposive sampling technique was used by the researcher for selection and assignment of three Government Science and Technical Colleges from the selected Area Council in FCT Abuja. School A, Government Girls Science secondary school (GGSSS) Kuje from Kuje Area Council, School B, Government Science and Technical College (GSTC) Kwali from Kwali Area Council, and School C Government Science Secondary School (GSSS) Maitama from Municipal Area Council, which was used for the study. Simple random sampling technique (using hat and draw method), where pieces of paper written "Yes" or "No" were folded for the students to pick from. Students who pick "Yes" option were selected, while those who pick "No" option were dropped. This was conducted in order to give the students equal chance of representation.

Two instruments used for the data collection are questionnaires. The first questionnaire is for the determining of the students learning pattern. The questionnaire included a list of three learning pattern purposive selected from seven students learning style in education needed for the teaching and learning. DSLP consisted of five (5) items from each of the three learning styles make up the total of fifteen (15) items of 5- point liker scale of Strongly Agree (SA), Agree (A), Undecided (U), Disagree(D) and Strongly Disagree (SD), rated 5,4,3,2 and 1 respectively.

The second questionnaire is on the perception and satisfaction students based on the learning pattern on Lesson Study method which comprises of two sections. Section A sought for background information about the respondents. Section B comprises of two (2) parts. Part 1 sought for the perception of students based on learning pattern on Lesson Study method. The questionnaire consists of twenty (20) items of 5- point liker scale of Strongly Disagree (SD), Disagree (D), Undecided (U), Agree (A) and Strongly Agree (SA), rated 1,2,3,4 and 5 respectively, and Part 2 sought for the student's satisfaction on Lesson Study. It consists of twenty (20) items of a 5-point liker scale of Very Satisfied (VS), Satisfied (S), Moderately Satisfied (MS), Fairly Satisfied (FS), Not Satisfied (NS) rated 5,4,3,2 and 1 respectively.

The questionnaires were validated by two experts from the department of science education, Federal University Technology, Minna, and the observations they made were noted and effected accordingly. Pilot study was conducted in a school that is within the population of study but outside the already sampled schools for the study. Simple random sampling technique (using hat and draw method), where pieces of paper written "Yes" or "No" were folded for the students to pick from. Students who pick "Yes" option were selected, while those who pick "No" option were dropped. This was conducted in order to give the students equal chance of representation. Fifty (50) students which pick yes option comprising of twenty-four (24) male students and twenty–six (26) female students which participated in the pilot study. Data were collected, analyzed and the reliability coefficient of the instruments calculated using Cronbach Alpha Coefficient. And yielded 0.98 and 0.82 values.

Prior to the field work, the researcher visited the selected school for the study to seek permission and cooperation from the respective school management after an approver from Department for science and Technology FCT Abuja. The data collected from administering the instruments were analyzed using frequency count for determination of students learning pattern, descriptive statistics (mean and standard deviation) for research questions and ANOVA research hypotheses. The researcher used 0.05 significant level to take decision for all the hypotheses formulated.

Results

The data collected from the students responses were analyzed using Means and Standard Deviation for the research questions and ANOVA for testing the research null hypotheses formulated for the study.

Research Question One

What is the perception based on visual, social and logical learning pattern of physics students taught heat and temperature using lesson study method in FCT Abuja?

Table 1: Mean and Standard Deviation on perception Response based on Visual, Social and Logical Learning pattern of Physics Students' using Lesson Study

Learning pattern	N	$\bar{x}$	Std. Deviation
Visual	169	80.44	8.22
Social	94	80.74	5.71
Logical	54	81.28	6.14
Total	**317**		

Table 1shows the mean and standard deviation response on perception based on the visual, social and logical learning pattern of physics students using lesson study. The result indicated that the mean and standard deviation of the three groups differ with a mean score of 80.44 with standard deviation of 8.22 for visual students, mean score of 80.74 with standard deviation of 5.71 for social leaning pattern students and mean score of 81.28 with standard deviation of 6.14 for logical learning pattern students. The logical learning pattern had the highest mean score then the social and visual pattern.

Research Question Two

What is the satisfaction based on visual, social and logical learning pattern of physics students taught heat and temperature using lesson study method in FCT Abuja?

Table 2: Mean and Standard Deviation on Satisfaction Response based on Visual, Social and Logical Learning pattern of Physics Students using Lesson Study

Learning pattern	N	Mean	Std. Deviation
Visual	169	70.33	9.35
Social	94	70.14	8.05
Logical	54	69.87	9.50
Total	**317**		

Table 2 shows the mean and standard deviation response on satisfaction based on the visual, social and logical learning pattern of physics students using lesson study. The result indicated that the mean and standard deviation of the three groups differ with a mean score of 70.33 with standard deviation of 9.35 for visual students, mean score of 70.14 with standard deviation of 8.05 for social students and mean score of 69.87 with standard deviation of 9.50 for logical students. The visual learning pattern had the highest mean score then the social and logical pattern.

Hypothesis One

There is no significant difference in the perception based on visual, social and logical learning pattern of physics students taught heat and temperature using lesson study method in FCT Abuja.

To test this hypothesis, Analysis of Variance (ANOVA) was applied on the students' response score regarding their perception based on visual, social and logical learning pattern using lesson study.

Table 3: ANOVA Result of Students' Perception based on the three Learning Pattern on Lesson study

Source of Variation	Sums of Squares	df	Means Square	F	p-value
Between Groups	29.111	2	14.556	0.279	0.757
Within Groups	16370.422	314	52.135		
Total	16399.533	316			

Not Significant at 0.05 level

Table 3 shows the ANOVA results of perception based on visual, social and logical learning pattern of physics students using lesson study. The result indicates F(2, 314) = 0.279, p = 0.757 >0.05. This shows that there was no significant difference in the mean response scores on perception of students based on visual, social and logical learning pattern using lesson study. On this basis, hypothesis one is therefore accepted. This shows that there was no difference in the perception of physics students on lesson based on the visual, social and logical learning pattern.

Hypothesis Two

There is no significant difference in the satisfaction based on visual, social and logical learning pattern of physics students taught heat and temperature using lesson study method in FCT Abuja.

To test this hypothesis, analysis of variance (ANOVA) was applied on the students' response score regarding the satisfaction level based on visual, social and logical learning pattern using lesson study.

Table 4: ANOVA Result of Students' Satisfaction Level on based on the three Learning Pattern Using Lesson Study

Source of Variation	Sums of Squares	df	Means Square	F	p-value
Between Groups	9.135	2	4.568	0.056	0.945
Within Groups	25498.739	314	81.206		
Total	25507.874	316			

Not Significant at 0.05 level

Table 4 shows the ANOVA results on satisfaction level based on visual, social and logical learning pattern of physics students using Lesson Study. The result indicates F (2, 314) = 0.056, p = 0.945> 0.05. The result shows that there was no significant difference in the mean response on satisfaction level of students based on visual, social and logical learning pattern. On this basis, hypothesis two is therefore accepted. This shows that there was no difference in the satisfaction level of physics students based on visual, social and logical learning pattern on lesson study.

Discussion

Finding that emanated from this study on perception of physics students based on the visual, social and logical learning pattern taught heat and temperature on lesson study method in FCT Abuja. The result indicated that the mean and standard deviation of the three groups differ with a mean score of 80.44 with standard deviation of 8.22 for visual students, mean score of 80.74 with standard deviation of 5.71 for social students and mean score of 81.28 with standard deviation of 6.14 for logical students. The logical learning

pattern had the highest mean score than the social and visual pattern. This finding is in line with the earlier findings of Bethel-Eke and Eremie (2017), who found out that visual, auditory and kinesthetic learning styles alike enhances academic performance of students.
Hypothesis one finds out if there is significant difference in the mean perception score based on visual, social and logical learning pattern of physics students taught heat and temperature using lesson study method in FCT Abuja. The result shows that there was no significant difference in the response on perception of students based on visual, social and logical learning pattern. This finding is in line with the earlier findings of Bethel-Eke and Eremie (2017), who found out that visual, auditory and kinesthetic learning styles alike academic performance of students were enhanced. Thus, both group leaners have similar perception of lesson study, this implies that lesson study is perceived to be appropriate for both categories of learners.

Finding that emanated from this study on the satisfaction of physics students based on the visual, social and logical learning pattern taught heat and temperature on lesson study method in FCT Abuja. The result indicated that the mean and standard deviation of the three groups differ with a mean score of 70.33 with standard deviation of 9.35 for visual students, mean score of 70.14 with standard deviation of 8.05 for social students and mean score of 69.87 with standard deviation of 9.50 for logical students. The visual learning pattern had the highest mean score then the social and logical pattern. Similarly, the finding of the corresponding hypothesis shows that there was no difference in the satisfaction level of physics students based on visual, social and logical learning pattern on lesson. This finding is not in line with the earlier findings of Udofia and Sambo (2019) who found out that student were not satisfied with the level of use of innovative strategies for lesson delivery. Thus, both group leaners have similar satisfaction level of lesson study, this implies that lesson study is perceived to be appropriate for both visual, social and logical learners.

Conclusion

The result from this study revealed that physics students visual, social and logical learners in FCT Abuja have positive perception of lesson study. Physics students with visual, social and logical learning styles in FCT Abuja are satisfied with lesson study. The findings show that there was no significant difference in the response on perception and satisfaction of physics students based on visual, social and logical learning pattern. The researcher therefore concluded that lesson study should be adopted in all the secondary schools in FCT Abuja.

Recommendations

From the findings of this research, the following recommendations are made:

(i) Lesson Study should be adopted by FCT school principals and teachers to improve students learning perception and satisfaction.
(ii) Other difficult topics in physics such as simple harmonic motion, energy quantization and electromagnetism should be subjected to this kind of investigation.
(iii) Both the Federal and State governments should implement lesson study in all the secondary school in Nigeria.

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