ANALYSIS OF PROBLEM-BASED LEARNING STRATEGY AND SECONDARY SCHOOL STUDENTS' PERFORMANCE IN TEACHING AND LEARNING OF COMMERCE

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Abstract

The study investigated analysis of problem based learning strategy and senior secondary school students' academic performance in teaching and learning of Commerce in Obio/Akpor Local Government Area of Rivers State. Three research questions and three null hypotheses guided the study. The study adopted quasi-experimental design. A sample of 400 SS2 students was used for the study. Three instruments were formulated for the study: Commerce Achievement test, Commerce Interest Questionnaire and Active Participation Questionnaire were used for the data collection. Face, content and construct validity was made by the supervisor and two other experts. The reliability was ascertained using Cronbach alpha method which yielded an index of 0.76 and Pearson Product Moment Correlation was used and an index of 0.82 was obtained. Mean and standard deviation were used to answer the research questions while ANCOVA was used to test the hypotheses at 0.05 Alpha level of significance. Findings revealed that there is a significant difference in students' academic performance in urban and rural schools taught Commerce with PBL. The null hypothesis that there is no significant difference students' academic achievement of urban and rural schools taught commerce with PBL was rejected; there is no significant difference between the retention scores of students taught Commerce using PBL and those taught using Conventional Teaching Method (Expository Method) was rejected and lastly there exists significant difference in the active participation scores of students in the PBL and Conventional Teaching Method (Expository Method)group. The null hypothesis was rejected. It was concluded that the use of problem based learning strategy enhances students' interest, achievement in Commerce and also improves their retention of learnt material. This strategy is efficacious, learner-oriented and allows active participation than the conventional strategy which is passive and teacher-centred. Based on the findings: it was recommended that seminars and workshops should be organized for Commerce teachers in elementary and secondary schools to use Problem-based learning in the classroom, Commerce teachers should endeavour to give female and male students equal opportunities in the classroom. Teachers of Commerce are advised to adopt PBL as it enhanced male and female students' interest, achievement and retention in Commerce. In the use of PBL, both sexes are capable of competing and collaborating in classroom activities.

Keywords: Problem-based, strategy, secondary school, academic performance.

Introduction

To meet the growing needs of the business society, there is greater demand for sound development of commerce education. The relevance of commerce education has become more imperative; this means a marked change in the way commerce education is perceived. As a branch of knowledge, Commerce imparts experience of business world at large in all its manifestations. It prepares its learners for personally fruitful and socially desirable careers in the field of business. Chessman (2015) defined Commerce Education As - Commerce education is that form of instruction which both directly and indirectly prepare the business man for his calling. Nichols (2019) defined as - Commerce education is a type of training which, while playing its part in the achievement of the general aims of education of any given level, has for

its primary objective the preparation of people to enter upon a business career, or having entered upon such a career, to render more efficient service therein and to advance from their present levels of employment to higher levels.

Education is a very important human activity. It helps any society fashion and model individuals to function well in their environment. According to Boit, Njoki and Changach (2012), the purpose of education is to equip the citizenry to reshape their society and eliminate inequality. It is widely regarded as a basic human right, a key to enlightenment, and a source of wealth and power (Mugenda & Mugenda, 1999). Education is critical to industrial and technological development, with the history of developed nations bearing records of this and developing nations aspiring to realize the same status have to put a premium on it. Education is a cooperative teaching-learning process of preparing an individual from birth and all through his/her life for happy useful living in the society within the culture and resources (Oyekan, 2000). It then follows that education is a social service which ensures refinement of human behavior in terms of his/her processes of reasoning, feeling and doing things in a happy expectancy.

Teachers at all levels of education play the decisive role in pivoting the growth and the direction of education. It is an acceptable fact that teacher is the most important cog in the educational machine and that teachers are highly instrumental to the success of any educational programme embarked upon by any government. This is because apart from being at the implementation level of any educational policy, the realization of these programmes also depends greatly on teacher's dedication and commitment to their work (Ukwayi, Angioha, & Ojong-Ejoh, 2018). Secondary Education is an important sector in national and individual development. It plays a vital role in creating a country's human resource base at a level higher than primary education (Awhen, Abunimye & Ipuole, 2014; Enu, Unimna & Odidi, 2017). Provision of quality secondary education is therefore important in generating the opportunities and benefits of social and economic development. One of the indicators of quality of education being provided is cognitive achievement of learners (United Nations Educational, Scientific and Cultural Organization.

This implies the engagement and manipulation of the learners' sense organs for the purpose of transferring knowledge, skills, attitude, belief system etc. and training to acquire proficiency. For many decades now, researchers, scholar's educators, professionals' or other stakeholders in education have mounted researches to redefine the ways to teach and cause students to learn. Many theories and models have been postulated to guide the processes. Over these years emphasis was on setting the classrooms and individual learners to conform. The modes of information transfer of course are often verbal and learners remain passive.

Sadly, in recent time the products of Nigeria's secondary school can no longer compete favourable with their counterparts from other parts of the world. The reason for this is not far-fetched. It is simple that the quality of education has fallen. To buttress this point, Esu (2006) opined that there is a near national outcry on the poor quality of Education in Nigeria. Also, commenting on this, Ige (1997) noted that the scripts of some of our secondary school were unreadable and far beyond comprehension. This underachievement becomes eminent when one considers the achievement of students in public examinations (Samba & Eriba, 2012). There

is also the problem of poor teaching methods by teachers on some practical aspects (Khan, & Ahmed, 2013).

The foregoing scenario points to the need for more investigation on teaching strategies. This research work therefore set out to investigate the teaching strategies that could improve students' interest, achievement and retention. Freeman (2014) suggests that addressing the problem of secondary school students' poor performance in achievement tests appears rather frequenting on teacher-cantered factors (effectiveness) than student-cantered factors. Therefore, there is the need to fill this gap (student-cantered factor). The researcher used Problem-Based Learning – one among innovative teaching strategies student-cantered to see if it could enhance performance in teaching and learning.

Statement of the Problem

Research has shown that the causes of students' poor performance especially commerce among others is the use of poor teaching method by teachers. Perhaps, the teaching method in use in many schools seems not to have brought about an effective teaching-learning, and could have resulted in students' poor academic performance. Hence, the need to adopt a better teaching method that would positively influence candidates' academic performance.

Preliminary investigation conducted by the researcher on teaching methods used by Commerce teachers in the study area revealed that most Commerce teachers use the conventional teaching method such as demonstration with the Commerce textbooks serving as instructional materials. Since the current teaching method failed to yield expected result, there is a need for the use of an alternative instructional strategy like Problem-Based Learning that may likely improve students' interest, achievement and retention in commerce in Rivers State. These premises necessitated the study. The statement of the problem is therefore stated in question form: What effects could Problem-Based Learning have on students' interest, achievement and retention in Commerce class?

Purpose of the Study

The main purpose of the study is to determine Problem-based learning strategy and senior secondary school students' academic performance in teaching and learning**.** Specifically, the study sought to:

1. Ascertain the difference in the academic performance between urban and rural Senior Secondary school students in commerce exposed to problem-based learning and those exposed with the conventional method
2. Examine the difference in the retention of Senior Secondary school students in commerce when exposed to problem-based learning and those taught using conventional teaching method (expository method).
3. Determine the difference in the active performance of senior secondary school students in commerce when exposed to problem-based learning and those taught using conventional teaching method (expository method).

Research Questions

The following research questions will guide the study:

1. What is the difference in the academic performance between urban and rural Senior Secondary school students in commerce exposed to problem-based learning and those exposed with the conventional method?

2. What is the difference in the retention of Senior Secondary school students in commerce when exposed to problem-based learning and those taught using conventional teaching method (expository method)?
3. What is the difference in the active performance of senior secondary school students in commerce when exposed to problem-based learning and those taught using conventional teaching method (expository method)?

Hypotheses

The following null hypotheses will be formulated and tested at 0.05 level of significance:

H_{01}: There is no significant difference in the academic performance score of urban and rural students in commerce exposed to problem-based learning those taught using conventional teaching method.

H_{02}: There is no significant difference in the mean retention scores of students taught commerce using problem-based learning and those taught using conventional teaching method.

H_{03}: There is no significant difference in the active participation of students taught commerce using problem-based learning and those taught using conventional teaching method.

Conceptual Framework

Problem-Based Learning

In a classroom where problem Based Learning is used, learners progressively take much more responsibility for their own learning (active learning), and that may help them to become independent learners in their whole lifetime. Owoeye (2016) reports that problem Based Learning is a strategy that allows students to interact with the learning situation while dealing with structured problems. The structured problem is one where the initial situations do not provide all the necessary information to develop a solution, and there is no one correct way to solve the problem. By means of problem Based Learning, students' skills in relation to problem-solving, thinking, group work, communication, information, acquisition and information sharing with others may be positively affected. Problem Based Learning has been found to be effective in other subjects and the researcher would want to find out if it would be effective in commerce as well at the senior secondary schools in Rivers State. It is also of interest to find out if it enhances interest of students.

The problem-based learning turns the student from passive information recipient to active, free self-learner and problem solver, and it slides the emphasis of programmes from teaching to learning. This enables students to learn by confronting with the problems to be solved (Akinoglu & Tandogan, 2007). By means of problem-based learning, some traits of students in relation to such areas as problem-solving, thinking, group work, communication, information acquisition and information sharing with others are positively affected. The basis of the problem-based learning mainly comprises problem, solution, practice, research, questioning, realism, originality and integration. Problem- based learning then is a term used for a range of pedagogical approaches that encourage students to learn through the structured exploration of a research problem.

Hmelo-Silver (2004) defines PBL as an instructional strategy in which students learn through facilitated problem solving that centers on a complex problem that does not have a

single correct answer. She said that students work in collaborative groups to identify what they need to learn in order to solve a problem, engage in self-directed learning, apply their new knowledge to the problem and reflect on what they learn and the effectiveness of the strategies employed. Olo (2009) opined that PBL as an instructional strategy in which complex problems rooted in real life situation are to motivate learners in discovering important concepts: their inter connections and making generalization. The aim of problem-based learning is to provide acquisition of information based on facts. In order to achieve this aim, problems are chosen out of the real world. The individual is being developed by making possible the integration with information accumulation of the student. The problem-based learning is performed in session within which there are small working groups consisting 6 or 8 persons, guided by an education mentor. They deal with scenarios involving problems in the above mentioned session and try to find appropriate answers to these problems.

The most important role of the mentor in the problem-based learning being operated in a student-centered manner is to facilitate learning activities by guiding students. Teaching mentors fulfil this role by monitoring discussion, asking questions, helping in the resolution of occasional conflicts, enabling the participation of each group member in classroom discussions, giving examples when required, preventing straying out of discussion and making evaluation (Akinoglu & Tandogan, 2007). Problem-Based Learning could be linked as follows:

The PBL classroom should raise the following questions: What do you know? What is the evidence? What is the argument that interprets the evidence? Are there alternative explanations or better ways of explaining the situation or solving the problem? The Problem-Based Learning (PBL) is then used to assess what is known, to answer questions, and then to analyse various options before presenting a recommendation or solution. The term 'model' is used in PBL in two senses:

a. To provide a structure for the carrying out of each problem unit (for example, 8 step model).
b. To describe an instructional model (organization of class sessions).

A typical Problem-Based Learning Model (PBLM) includes:

(1) Read and try to understand the scenario and situation. Check your understanding of the scenario. Don't be tempted to start thinking about potential solutions or to start looking for information. You will be more effective in addressing complex scenarios by following Steps 1 through 8.

(2) List your personal understanding, that is, what you know, ideas, or hunches. You will usually have some understanding about the cause of the problem or ideas about how to solve the problem. These need to be listed; they will be supported or refuted as your investigation proceeds. You will also list many alternative conceptions that need to be addressed.

(3) List what is known. If there is need, print a copy of the scenario and situation. Make a list of everything you know. You do not need to conduct any research at this point. Just write from what you have known and. the information that is included in the scenario.

(4) List what is unknown. Prepare a list of questions that you think need to be answered to solve the problem. Several types of questions may be appropriate. Some may address concepts or principles that need to be learned in order to address the situation. Other questions may be

in the form of requests for more information. These questions will guide research that may take place on the Internet/WWW, in the library, or with other sources.

(5) List what needs to be done. Plan your investigation. Such actions may include questioning an expert, getting online data, or visiting a library to find answers to the questions developed in Step 4. When working with a team, every member must be involved.

(6) Develop a problem statement. A problem statement is a one or two sentence idea that clearly identifies what you are trying to solve, produce, respond to, test, or find out. In more complex situations, you may have to begin one step, and then consider the emerging information in order to complete the previous step. Keep in mind that the problem statement may have to be revised as new information is discovered and brought to bear on the situation.

(7) Gather information. You will gather information from various sources. exchange ideas; think about solutions; and consider the pros and cons of potential courses of action. As more information is gathered, the problem statement may be refined or altered. Or, based upon your research data, a recommended solution or opinion may be appropriate.

(8) Present finding. in which you make recommendations, predictions, inferences, or other appropriate resolutions of the problem. Be prepared to support the positions you take. If appropriate, consider a multimedia presentation using images, graphics, or sound. The steps in this model may have to be completed several times. Steps 3 through 7 may be conducted concurrently as new information becomes available.

Theoretical Framework

Gagne's Theory of Condition of Learning Outcomes (1985)

The theory of condition of learning outcomes was propounded by Gagne in 1985. The theory advocates for learning that enhances human intellectual development. Gagne's theory explains 5 major learning outcomes of instructional objectives (compare Bloom's Taxonomy) as: (1) Intellectual skills – review of relevant rules. (2) Verbal information – information that organizes contents. (3) Cognitive strategies – frequent preservation of new and challenging problems. (4) Attitudes – reinforcement and (5) Motor skills – practice.

From these outcomes, it can be concluded that: (1) Learning is complex and diverse, different learning outcomes (capabilities) require different instructions, prerequisites and processing by the learners. In other words, the specific operations that constitute instructional events are different for each different learning outcome. (2) Events of learning operate on the learner in ways that constitute the conditions of learning. The internal states of the mind required in the learner to acquire the new skills are internal conditions of learning, while the environmental stimuli required to support the internal learning process are referred to as external conditions of learning. Learning hierarchies define what intellectual skills are to be learned and a sequence of instruction.

The relevance of Gagne's theory is his analysis of the conditions most conducive for learning the capabilities. And that the specific operations that constitute instructional events are different for each different learning outcome. The impact of this theory on the teaching and learning of Commerce is that events of learning are involved in Problem-Based Learning (PBL) such as students' participatory activities, sharing of ideas and the inclusion of variety of learning activities throughout the lesson. For instance, instructional strategy and materials that promote student -to-student interactions, group project and presentation that allow provision of

opportunities for effective and creative thinking in the learning programme. Students discover and gain insight into a problem and construct their own realistic ideas from the knowledge and skills they have acquired. Thus, students get an in-depth understanding and long term retention of what they have learnt and in turn increase achievement.

Woolfolk's Constructivism Theory of learning (2009)

The constructivism theory of learning was propounded by Woolfolk in 2009. Woolfolk (2009) theorizes that the learner contributes to meaning and learning through both individual and social activity. The theory emphasizes the active role of the learners in building, understanding and making sense out of information. Constructivism also argues that individuals learn best when they actively construct knowledge and understanding through interacting with others. The emphasis here, is on interaction with others rather than actions of individuals.

Constructivism makes use of information processing theories. Information processing approaches to learning regard the human minds as a symbol of processing system. This system converts sensory input into symbol structures (propositions, images or schemes) and then processes (rehearses or elaborates) the symbol structures to knowledge that can be held in memory and retrieved (retentions). The outside world is seen as the source of input, but once the sensations are perceived and entered into working memory, the important work is assumed to be happening within the individual. There are two forms of constructivism (Woolfolk, 2008):

Methodology

Quasi-experimental design of pre-test post-test of non-randomized groups because it was not possible to randomly assign subjects to treatment groups. The population for the study comprised of all the twenty five thousand, five hundred and seven (25,497) SSII students in the 261 Public Senior Secondary Schools in Port Harcourt Metropolis (Source: Rivers State Ministry of Education, 2019 students' enrolment figure). The sampling techniques used for this study was selected through multi-stage sampling technique. Simple random sampling (hat and draw) method was used to select eight (8) co-educational schools from the senatorial zone. The hat and draw method was used to select one arm of SS 2 class from each school as experimental class and the other arm as control class for the study.

Thus 25 students were selected from each arm. Three instruments were used for data collection in the study namely: Commerce Achievement Test (CAT); and Commerce Interest Test (CIT). To ensure validity of these instruments, copies of the instrument was given to the researcher's supervisor and two other experts in the faculty of education. Each of the evaluators were provided with a copy of letter explaining what they were requested to do, the instruments, research topic, purpose of the study, lesson plans, table of specification, research questions and hypotheses. The Commerce Achievement Test (CAT) was subjected to face and content validation while Commerce Interest Test (CIT) and Active Participation Questionnaire (APQ) were subjected to face and construct validation.

The research supervisor and the two other experts were requested to validate the instruments based on their specialized areas. A pilot test was carried out in two co- educational schools in Local Government which were not part of the sample, which was outside the study area. The aim of the pilot test will be to estimate the reliability of the research instruments and to determine the workability of the research design and procedures. Researcher briefed the 8research assistants (1 from each participating school) on the use of PBL for experimental

group. The researcher took permission from all principals of the selected schools for data collection. The research assistants collected the data and hand over to the researcher. The research questions were answered using descriptive statistics (mean and standard deviations) whiles all the hypotheses were tested at 0.05 level of significance using Analysis of Co-variance (ANCOVA) with the pre-test scores as a covariate.

Analysis And Discussion Of Findings

Research Question 1: What is the difference in the academic performance between urban and rural Senior Secondary school students in commerce taught with Problem-Based Learning?

Table 4.1: Mean Academic Performance Scores and Standard Deviations of Urban and Rural Area Students exposed to PBL

Location	N	Pre CIT mean score		Post CIT mean score		Mean Gain
		$\bar{x}$	Δ	$\bar{x}$	δ	
Urban	41	54.27	15.675	72.80	9.621	18.53
Rural	176	45.47	14.040	65.00	10.351	19.53
Mean Difference		8.8		7.8		-1.0

Table 4.1 presents mean interest scores and standard deviations of Urban and Rural area students exposed to PBL. The table shows the difference between the mean interest scores of Urban and Rural area students in the PBL group at pre CIT as 8.8. The table also reveals the difference in the mean scores of the students at post CIT as 7.8. The mean gain of urban students was shown as 18.53 while that of rural students was 19.53. The difference in the mean gains between different location was -1.0.

Research Question 2: What is the difference in the retention of Senior Secondary school students in commerce taught with Problem-Based Learning and those taught using Conventional Teaching Method (Expository Method)?

Table 4.2: Mean Standard Deviations of Students exposed to PBL and those taught Commerce using Conventional Teaching Method (Expository Method)

Group (Strategy)	N	Post CAT mean score		Retention Score		Mean Gain
		$\bar{x}$	Δ	$\bar{x}$	δ	
PBL	200	66.47	10.645	74.06	12.778	7.59
Conventional Teaching Method (Expository Method)	200	52.45	17.500	51.58	18.048	-0.87
Mean Difference		14.02		22.48		6.72

Table 4.2 presents mean retention scores and standard deviations of students exposed to PBL and those taught Commerce using Conventional Teaching Method (Expository Method). The table shows the difference between the mean retention scores of students in the PBL group and Conventional Teaching Method (Expository Method) group at posttest as 14.02. Table 4.4 also reveals the difference in the mean achievement scores of students in the PBL and Conventional Teaching Method (Expository Method) groups at retention test as 22.48. Results

from the table shows that the PBL group had a mean gain of 7.59 while the Conventional Teaching Method (Expository Method) group gained -0.87. The difference in the mean gains between the groups was 6.72.

Research Question 3: What is the difference in the active participation of Senior Secondary school students in commerce taught with Problem-Based Learning and those taught using Conventional Teaching Method (Expository Method) in Rivers State?

Table 4.3: Active participation Scores and Standard Deviations of Students exposed to PBL and those taught Commerce using Conventional Teaching Method (Expository Method)

Group/ Strategy	N	Post CAT mean score		APS		Mean Gain
		$\bar{x}$	δ	$\bar{x}$	δ	
Problem-Based Learning	200	65.64	10.888	74.45	12.676	8.81
Conventional Teaching Method (Expository Method)	200	67.61	10.257	73.60	12.958	5.99
Mean Difference		1.97		0.85		2.82

Table 4.3 presents active participation scores and standard deviations of students exposed to PBL and Conventional Teaching Method (Expository Method). The table shows the difference between the active participation scores of students in the PBLand Conventional Teaching Method (Expository Method) at pre APT as 1.97. The table also reveals the difference in the mean scores of the students at post APT as .85. The mean gain of students taught using Conventional Teaching Method (Expository Method) was 5.99 while that of PBL was 8.81. The difference in the mean gains between the two group was 2.82 in favour of PBL.

TEST OF HYPOTHESES

H_{01}: There is no significant difference in the achievement score of urban and rural students in commerce exposed to problem-Based Learning.

Table 4.4: ANCOVA Report on the Effect of PBL on Students' Achievement of urban and rural students in commerce

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2030.780[a]	2	1015.390	9.680	.000	.083
Intercept	75785.686	1	75785.686	722.497	.000	.771
Pre-Test	5.109	1	5.109	.049	.826	.000
Location	1961.028	1	1961.028	18.695	.000	.080
Error	22447.330	214	104.894			
Total	983375.000	200				
Corrected Total	24478.111	216				

Table 4.4 presents ANCOVA report on the effect of PBL on students' achievement in urban and rural students in Commerce. Report from the table reveals that F(1,214) = 18.695 and p = 0.00. This result shows that p<0.05 and indicative of the fact that there is a significant difference in students' academic performance in urban and rural schools taught Commerce with PBL. The null hypothesis that there is no significant difference students' academic achievement of urban and rural schools taught commerce with PBL was rejected.

H_{02}: There is no significant difference in the mean retention scores of students taught commerce using Problem-Based Learning and those taught using conventional teaching method.

Table 4.5: ANCOVA Report on the Effect of PBL on Students' Retention in Commerce

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	109099.247[a]	2	54549.623	660.411	.000	.769
Intercept	2696.145	1	2696.145	32.641	.000	.076
Post_Test	60112.276	1	60112.276	727.756	.000	.647
Group_Type	8106.076	1	8106.076	98.137	.000	.198
Error	32791.993	397	82.599			
Total	1761402.000	400				
Corrected Total	141891.240	399				

Table 4.5 presents one-way ANCOVA report on the effect of PBL on students' retention in Commerce. The table reveals that F(1,397) = 98.137 and p = 0.00. This result reveals that p<0.05 which indicates a significant difference between the PBL and Conventional Teaching Method (Expository Method) groups. Since p<0.05 the null hypothesis which states that there is no significant difference between the retention scores of students taught Commerce using PBL and those taught using Conventional Teaching Method (Expository Method) was rejected. The partial eta squared value for group was shown as 0.198 which indicates that 19.8% in the mean retention scores variance of students in the two groups was attributed to PBL. The study concluded that students taught Commerce using PBL had higher significant retention scores than those taught via the conventional method.

There is no significant difference in the active participation scores of students taught commerce using Problem-Based Learning and those taught using conventional teaching method in Rivers State.

Table 4.6 ANCOVA Report on the Effect of PBL on Students' Active Participation in Commerce

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	7924.594[a]	2	3962.297	32.995	.000	.236
Intercept	6804.067	1	6804.067	56.658	.000	.209
Post_Test	7904.142	1	7904.142	65.819	.000	.235
Group_Type	159.954	1	159.954	1.332	.250	.006
Error	25699.075	214	120.089			
Total	1215265.000	200				
Corrected Total	33623.668	216				

Table 4.6 presents one-way ANCOVA report on the effect of PBL on students' active participation in Commerce. Report from the table reveals that F(1,214) = 1.332 and p = 0.250. This result shows that p<0.05 and indicative of the fact that there exists significant difference in the active participation scores of students in the PBL and Conventional Teaching Method (Expository Method) group. The null hypothesis was rejected. Therefore, this implies that there is significant difference in the students' active participation of students exposed to PBL and Conventional Teaching Method (Expository Method) in commerce.

Summary of Findings

- Table 4.1 reveals that F(1,214) = 18.695 and p = 0.00. This result shows that p<0.05 and indicative of the fact that there is a significant difference in students' academic performance in urban and rural schools taught Commerce with PBL. The null hypothesis that there is no significant difference students' academic achievement of urban and rural schools taught commerce with PBL was rejected.
- Table 4.2 reveals that p<0.05 which indicates a significant difference between the PBL and Conventional Teaching Method (Expository Method) groups. Since p<0.05 the null hypothesis which states that there is no significant difference between the retention scores of students taught Commerce using PBL and those taught using Conventional Teaching Method (Expository Method) was rejected.
- Table 4.3 reveals that F(1,214) = 1.332 and p = 0.250. This result shows that p<0.05 and indicative of the fact that there exists significant difference in the active participation scores of students in the PBL and Conventional Teaching Method (Expository Method) group. The null hypothesis was rejected.

Discussion of Findings

The difference in the academic performance between urban and rural Senior Secondary school students in commerce exposed to problem-based learning and those exposed with the conventional method in Rivers State

Table 4.1 also reveals the difference in the mean achievement scores of students in the PBL group had a higher mean gain compared to those of their colleagues in the conventional group. The finding has revealed the efficacy of the use of PBL in enhancing students' achievement in Commerce. The study also sought to find out the difference in mean achievement scores of male and female students in Commerce exposed to PBL and those taught using Conventional Teaching Method (Expository Method).

The difference in the retention of Senior Secondary school students in commerce when exposed to problem-based learning and those taught using conventional teaching method (expository method) in Rivers State

Table 4.2 showed the mean achievement scores and standard deviations of male and female students exposed to PBL. The table revealed that the difference in the mean gain achievement scores of male and female students at posttest was higher in favour of the male. However, contrary to this view in table 4.5 which showed ANCOVA report on the effect of PBL on students' achievement in Commerce based on gender. This result showed that p>0.05 and indicative of the fact that there exists no significant difference in the mean achievement score of male and female students' in the PBL group. The null hypothesis that there is no significant difference in the mean achievement scores of male and female students exposed to PBL in Commerce was accepted. The conclusion of the study was that male and female students taught Commerce using PBL equally benefitted from the strategy.

The finding of the present study corroborates with the study of Ali, Hukamdad, Akhtar and Khan (2010) from Pakistan, Apaçik (2009) in a rural area of Ankara in the Middle – East as well as Bawa (2011) in Zaria, Ogunkunle (2007) in Rivers State, Nigeria. These studies attested that PBL students performed better than the Conventional Teaching Method (Conventional

Teaching Method (Expository Method)). However, the results revealed that male students in the constructivist group were significantly better than their female counterparts in the group.

The use of problem-based learning strategy or self-learning device was more effective in Commerce than the conventional method. Furthermore, the superiority of problem-based learning strategy over the conventional method could be attributed to the logical and sequential manner with which instruction is presented and practical skills in teaching. A student who is exposed to this type of strategy is more likely to possess a meaningful and in-depth knowledge of the content area. Such students will be able to organize their thoughts in an orderly manner that is essential for problem solving and acquisition of basic practical skills in Commerce.

The likely explanations for this outcome may not be unconnected with the fact that PBL fosters a deeper understanding of content knowledge. In addition, students in the PBL group, through social interaction with the group members, had ample opportunities to compare and evaluate their understanding of subject matters with others' understanding. This could be explained from the point of view that self-directed learning, one of the attributes of PBL, entails competence in essential skills of literacy and information location and retrieval. PBL also aroused interest and made students more focused leading to better understanding which translates to improved performance.

The result of the analysis also revealed that there is a significant difference in academic performance of students in urban and rural schools taught commerce using PBL. This result implies that location has significant influence on the use of PBL and the academic performance of students in commerce. This finding is supported by the work of Okeye (2009), Owoeye and Yara (2007) who submitted that environment is a major determinant of scholastic performance among learners and that academic performance of students differ between urban and rural areas.

The difference in the active performance of senior secondary school students in commerce when exposed to problem-based learning and those taught using conventional teaching method (expository method) in Rivers State

Table 4.2 presents the mean retention scores and standard deviations of students exposed to PBL and those taught Commerce using Conventional Teaching Method (Expository Method). The study revealed that the difference in the mean retention scores of students in the PBL was higher compared to Conventional Teaching Method (Expository Method) groups. Table 4.16 shows One-way ANCOVA report on the effect of PBL on students' retention in Commerce. The result revealed that $p<0.05$ which indicates a significant difference between the PBL and Conventional Teaching Method (Expository Method) groups. Since $p<0.05$, the null hypothesis which states that there is no significant difference between the mean retention scores of students taught Commerce using PBL and those taught using Conventional Teaching Method (Expository Method) was rejected.

The study concluded that students taught Commerce using PBL retention scores were significantly higher than those taught via the controlled method.

In this study, it was observed that the experimental group using PBL retained knowledge and were able to reproduce it more than the control group to which the conventional methods were applied. When the post-test and retention test scores of the two groups were compared

with each other, there was an improvement between the posttest and retention scores for the PBL group though there was an equal improvement between the post-test and retention scores of the control group. The increase in retention test scores in the PBL group is an indication that the method employed in this group made the students to develop higher competence in essential practical skills and a deeper understanding of the content knowledge.

It also showed ANCOVA report on the effect of PBL on students' retention in Commerce based on gender. The result showed that $p>0.05$ and indicative of the fact that there exist no significant difference in the mean retention scores of male and female students' in the PBL group. The null hypothesis that there is no significant difference in the mean retention scores of male and female students exposed to PBL in Commerce was not rejected. The study concluded that PBL is not gender bias in Commerce.

The findings of this study was in agreement with that of Achor, Imoko and Uloko (2009) that students taught with a student-centered method are superior in achievement and retention than those taught with the conventional approach. The finding wais also in agreement with Yusuf, Maruf and Lateef (2016) in Sabon-Gari local government area of Kaduna State, Nigeria where it was revealed that there was significant mean difference between the performance of students exposed to PBL and those exposed to traditional method and that there is no significant difference between male and female students.. The finding agrees partly with Bawa (2011) who found that the experimental groups (LPM and BPM) retained higher than the control group (Conventional Teaching Method (Expository Method)), and partly disagrees that the difference in the mean was not statistically significant. This study is also in conformity with the earlier studies of Apaçik (2009) which revealed better long-term knowledge retention for PBL students.

The apparent improvement in retention may be attributed to the way learning occurs in PBL. PBL has the potential to structure knowledge so that acquisition and recall are optimized, students develop self-directed learning skills, and there was an increase in motivation for learning. Learning new knowledge in contexts of problem may foster its retrievability and use when needed for the solution of similar problems. This showed that the use of problem based learning strategy is desirable in promoting good performance of students at cognitive levels of educational attainment. It also revealed that exposing students to practical skills teaching could serve as a good way of enhancing their retention.

Conclusion

It was evident from the findings of this study that the use of problem based learning strategy enhances students' interest, achievement in Commerce and also improves their retention of learnt material. This strategy is efficacious, learner-oriented and allows active participation than the conventional strategy which is passive and teacher-centred. The effect of this teaching strategy is not dependent on gender. Performance in Commerce is a function of method rather than gender. Both sexes are capable of competing and collaborating in classroom activities. Since students' interest, achievement and retention of learnt materials are the main thrust of teaching Commerce; greater attention needs to be paid to the use of PBL as a teaching approach. Conducive learning atmosphere should also be provided for all categories of learners to learn Commerce.

The implications of the findings therefore are that Problem-based learning developed students' active learning and sharing with other learners. PBL also developed critical thinking process among students. The use of PBL boosted the performance of students in skills acquisition, problem solving ability and development of the right type of interest in Commerce as a subject. It was also concluded that the strategy was beneficial to both male and female students.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Seminars and workshops should be organized for Commerce teachers in elementary and secondary schools to use Problem-based learning in the classroom.
2. National Education Research and Development Council (NERDC) and other relevant governmental agencies are enjoined to sponsor further researches to determine the efficacy of PBL in other aspects of Commerce on a broader base
3. Commerce teachers should endeavour to give female and male students equal opportunities in the classroom. Teachers of Commerce are advised to adopt PBL as it enhanced male and female students' interest, achievement and retention in Commerce. In the use of PBL, both sexes are capable of competing and collaborating in classroom activities.

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