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Abstract

This study investigated the impact of students' workbook usage on the academic performance of learners in tertiary institution. The study utilized variation-finding comparison research design on a year 1 course. Systematic differences were created among students in different academic session by introducing the use of workbook to all students in a particular session (experimental group), while students in another session never made use of workbook (control group). The workbook was purposively used to vary level of connection and collaboration (team-base learning) amongst year one students. The data used for this paper was collected over three academic sessions (2013/14, 2014/15 and 2015/16). The students were from five different Departments and each department is taken as a cohort. The 2013/14 academic set serves as the control group and their results was compared with 2014/15 and 2015/16 separately using differentiating comparative analysis method. Both descriptive and inferential statistics were used to analysed the data result. The grouped data was analysed using Independence t-test, the students' grade was used to categorize students' population in each academic session to five (5) groups and the mean was calculated. The data was grouped, the mean ($\bar{x}$) of their result graded from A-F and the standard deviation (s) were calculated and n=5, p=0.05, df=4. Tcal =1.853, while T_c. The result revealed that there was a significant different in the academic performance of students who used workbook and those students that did not use workbook.

Introduction

Optimal classroom management may extend beyond students been quiet and waiting patiently for the instructor's instruction and the students like copious vessels receiving end information. Though most interactive sessions in a class requires lot of spelt out modalities to keep learners in shape throughout the course of a lesson. Collaboration, connectivism and team-based learning must come into play to create a suitable and ideal participatory class for learners. According to Palloff and Pratt (2005), to take classroom management to the next level, different learning styles and cultures can be accommodated more easily because effective collaborative learning values diversity. Shaw (2006) supported this affirmation that skills gained from the experience of collaborative learning are highly

transferable to team-based work environments. In modern teaching, instructors are to focus on specific instructional strategies that can be used to stimulate learners' interest and facilitate their participation in classroom and create connectivism among course mates, which will promote a friendly and conducive learning atmosphere amongst students in the classroom and promote self-generated collaboration, increased learning pool, and better learning outcomes.

Timidity, shyness, and lack of self-esteem may play a major role in reducing learners' participation in classroom. Such learners require strategic and ideal ways of encouraging them to build their self-esteem and confidence. According to Crawford & MacLeod (1990), the students' willingness to talk may influence their participation in the classroom, fore knowledge and set experience over a topic to be taught can stimulate learners' participation in classroom that agrees with (Fassinger, 1995; Howard & Henney, 1998; Howard, James & Taylor., 2002; Tinto, 1997) that students' preparation is a key factor to their participation. If researchers are not to limit relevance of physiology in psychology, we might need to be driving in line the work of early authors who stated the relevance of learners' state of mind such as emotions like confidence or fear in students' participation in the classroom (Fassinger, 1995; Howard & Henney, 1998; Howard et al., 2002; Terenzini, Pascarella, & Blimling, 1999). More particularly by engaging them with activities in and out of the classroom and allowing free flow interaction between learners' and their peers in and outside the classroom. Engagement; defined as "student-faculty interaction, peer-to-peer collaboration and active learning..." according to Chen, Gonyea, & Kuh, 2008, paragraph 2 of the article publication.

There have been many authors over the years that have researched over the merits of developing teaching methods that fully encompass and accommodate learners' participation in the classroom, this is in line with the work of Tatar in 2005, where he clearly stated that active classroom participation played an important role in the success of education and students' personal development in the future. There will be a need to create a teaching method that will accommodate learners' participation in the classroom and a designed indicator to measure the level of learners' participation in the classroom, therefore providing a deck besiege activity design on an effective method on how to improve learners' participation for a course, its relative effect on their learning ability and the outcomes on their performance expectations. These concur with the work of Astin in 2005, as he stated that active participation of students will confer higher satisfaction and higher persistence rates. Empirical researchers and authors in the study of learners' participatory behaviours have identified factors having influences in encouraging or discouraging students' participation. Some influencing factors like age affects learners' participation (Karp & Yoels, 1976; Howard et al., 1996; Howard & Henney, 1998; Howard et al., 2002), according to Auster & MacRone, (1994) and Corneilius, Gray, & Constantinople, (1990) gender differences could play a pivotal role in creating such imbalances.
This study will help instructors to identify the most suitable teaching methods for different age cadre, academic levels, approach to different courses and the efficacy of learners' interest and participation in an optimally functioning classroom.

Statement of the Problem

In recent time, there have been lots of questions on learners' attitude towards learning at various levels and this poses a lot of problems classroom for learning. A major undefined problem is 'what a classroom should be to a learner?' There is an urgent need to redefine what a classroom is to a learner; this will help to create diverse ways to stimulate their learning interest. Teaching is not done until learning is achieved; otherwise teaching becomes dissemination of information to recipient without a definite cause for propagation. An ideal way to achieve teaching and learning in the classroom and in classroom extensions is to create an atmosphere to support learners' participation in classroom and promote active reading.
A major problem of learning is loss of interest by a student when in the classroom or loss of interest in attending the class, another is share of interest for a student or group of students by giving preference to other things that compete with their interest for the class, most students are pre-occupied with other activities they will be engaged in outside the classroom thereby seeing the lesson period as sheer waste of time.
Other major problems with learners' participation in classroom include loss of confidence, timidity and lack of preparation owing to lack of initial active learning to prepare ahead of lessons, all these are common major problems of learners' participation in the classroom. This study intends to spell out the common factors that cause loss of interest and participation among learners in the classroom and to suggest an effective teaching method that will stimulate learners' interest and encourage them to participate in the classroom.

Purpose of the Study

The intent of this research work is to create a suitable and more convenient teaching method that will increase learners' participation in the classroom.
This study specifically will find out

- The influence of students' collaboration and connectivism among learners on participation in classroom
- The relationship between learners' participation and their learning ability
- The influence of learners' participation on their academic performance

Research Questions

The following research questions will guide this study:

1. To what extent will collaboration and connectivism among learners affect learners' participation in classroom
2. Is there any relationship between learners' participation and their learning ability?
3. To what extent will of learners' participation affect their academic performance

Methodology

Three lecturers taught the course for the academic session 2013/14. Lecturers are assigned from both departments of Integrated Science and Biology, a lecturer from Department of Integrated Science and two (2) lecturers from Biology. The study was carried out between the academic years 2013/14 to 2015/16. All Integrated Science double major students that have been admitted to study Integrated Science as a subject combination with other subject courses must offer this course in their first year of the program. The course title is 'Components of the Environment I' and the course code is ISC 114, with a compulsory (C) status for all Integrated Science double major students. The five departments offering this course in the first year of their N.C.E program in the School of Science, Department of Integrated science in the Federal College of Education (Technical), Akoka are Integrated Science/Mathematics, Integrated Science/Biology, Integrated/Physics, Integrated Science/Chemistry, and Computer/Integrated Science. The research work made use of three academic sets with two distinct teaching methodology and approach. The first sets of students in 2013/14 academic year were taught with the normal traditional instructor-centered method, activities were given without activity manual book, so students are expected to design and submit their own reports based on simple information from instructional contents drawn from the Nigerian Colleges of Education Minimum Standard book for the Integrated Science activity on ISC 114 'Components of the Environment I'. Three (3) lecturers taught the course for the academic session 2014/15, two lecturers from Biology Department and one from Integrated Science, but the only female lecturer had been replaced by another female lecturer from the Biology Department. There was a modification in the method of teaching and design for students' activities for the succeeding year of the 2014/15 academic session. An activity manual workbook was introduced by the instructors for use by the students. The activity manual workbook was designed to contain the lesson notes on the course and the outlines of the activities describing the whole procedure and the underlying principles which were sequentially and orderly arranged to help the students to prepare ahead of the class thereby enhancing students' participation in the classroom. The students had five theoretical classes on the course and five (5) activity classes in the Integrated Science Laboratory of the Department of Integrated Science of the School of Science, Federal College of Education. For the 2015/16 academic session, the activity workbook was designed in a similar way to the previous activity manual workbook for the 2014/15 academic session. The only difference was the introduction of students' report in the manual with the initial contents of lesson notes and activity procedures and requirements. The students submitted their activity manual workbooks for scoring. Scores were awarded based on content report, scientific experimental report of activities, inductive reasoning, deductions, observation, theoretical evaluations, face, and content validity.

Results

Data used for this paper was collected over three academic sessions 2013/14, 2014/2015 and 2015/16. The course title is 'Components of the Environment I' and the course code is ISC 114, with a compulsory (C) status for all Integrated Science double major students. The students are from five different Departments and each department is taken as a cohort. The total numbers of students who registered for the course and are assessed for the 2013/14 academic session were two hundred and thirteen (213) students; two hundred and four (204) of the students were regular student while

nine (9) were carry-over students. There were one hundred and fifty-six female students while forty-eight were male, the percentage of female to male was 73%:27%.
The results for the first session 2013/2014 are as follows for each of the five (5) cohorts.

Sessional Geometric Mean of Learners' Academic Performance
2013/14 Academic Session

For Integrated Science/Mathematics the total number of students was sixteen (16). There were sixteen (16) regular students with no carry over student. There were four (4) female and twelve (12) male students. For Integrated Science/Chemistry **t**he total number of students was thirty-three (33). There were thirty-one (31) regular students and two (2) carry over students. There were twenty-four (24) female and nine (9) male students. For Integrated Science/Biology **t**he total number of students was one hundred and three (103). There were ninety-nine (99) regular students and four (4) carry over students. There were ninety-seven (97) female and six (6) male students. For Integrated Science/Physics the total number of students was ten (10). There were ten (10) regular students with no carry over student. There were four (4) female and six (6) male students. For Computer/Integrated Science the total number of students was fifty-one (51). There were forty-eight (48) regular students and three (3) carry over students. There were twenty-seven (27) female and twenty-four (24) male students.

Table 1: Learners' academic performance grades for academic session 2013/14

	GRADES						TOTAL	Grade Point Total (GPT)	Mean GPT
DEPARTMENTS	**A**	**B**	**C**	**D**	**E**	**F**			
Integrated Science/Math	**2**	**5**	**4**	**1**	**3**	**1**	**16**	**47**	**2.94**
Integrated Science/Biology	**4**	**30**	**46**	**11**	**8**	**4**	**103**	**308**	**2.99**
Integrated Science/Chemistry	**3**	**10**	**12**	**5**	**3**	**0**	**33**	**104**	**3.15**
Integrated Science/Physics	**1**	**5**	**3**	**1**	**0**	**0**	**10**	**23**	**2.3**
Computer/Integrated Science	**2**	**9**	**25**	**6**	**9**	**0**	**51**	**117**	**2.29**

Academic Session 2014/2015

The results for the first session 2014/2015 are as follows for each of the five (5) cohorts.
For Integrated Science/Mathematics **t**he total number of students was seven (7). There were seven (7) regular students with no carry over student. There were four (4) female and three (3) male students. For Integrated Science/Chemistry **t**he total number of students was thirty-four (34). There were thirty-three (33) regular students and one (1) carry over student. There were twenty-two (22) female and twelve (12) male students. For Integrated Science/Biology **t**he total number of students was one hundred and seven (107). There were one hundred and seven (107) regular students with no carry over student. There were eighty-eight (88) female and nineteen (19) male students. For Integrated Science/Physics **t**he total number of students was nine (9). There were nine (9) regular students with no carry over student. There were five (5) female and four (4) male students. For Computer/Integrated Science **t**he total number of students was twenty-six (26). There were twenty-six (26) regular students with no carry over student. There were twelve (12) female and fourteen (14) male students.

Table 2: Learners' academic performance grades for academic session 2014/15

	GRADES						TOTAL	Grade Point Total (GPT)	Mean GPT
DEPARTMENTS	**A**	**B**	**C**	**D**	**E**	**F**			
Integrated Science/Mathematics	**0**	**2**	**2**	**0**	**2**	**1**	**7**	**19**	**2.71**
Integrated Science/Biology	**34**	**35**	**26**	**5**	**4**	**2**	**106**	**402**	**3.79**
Integrated Science/Chemistry	**6**	**8**	**11**	**4**	**3**	**2**	**34**	**106**	**3.12**
Integrated Science/Physics	**3**	**3**	**1**	**2**	**0**	**1**	**10**	**34**	**3.4**
Computer/Integrated Science	**2**	**6**	**13**	**5**	**0**	**1**	**27**	**83**	**3.07**

Academic Session 2015/2016

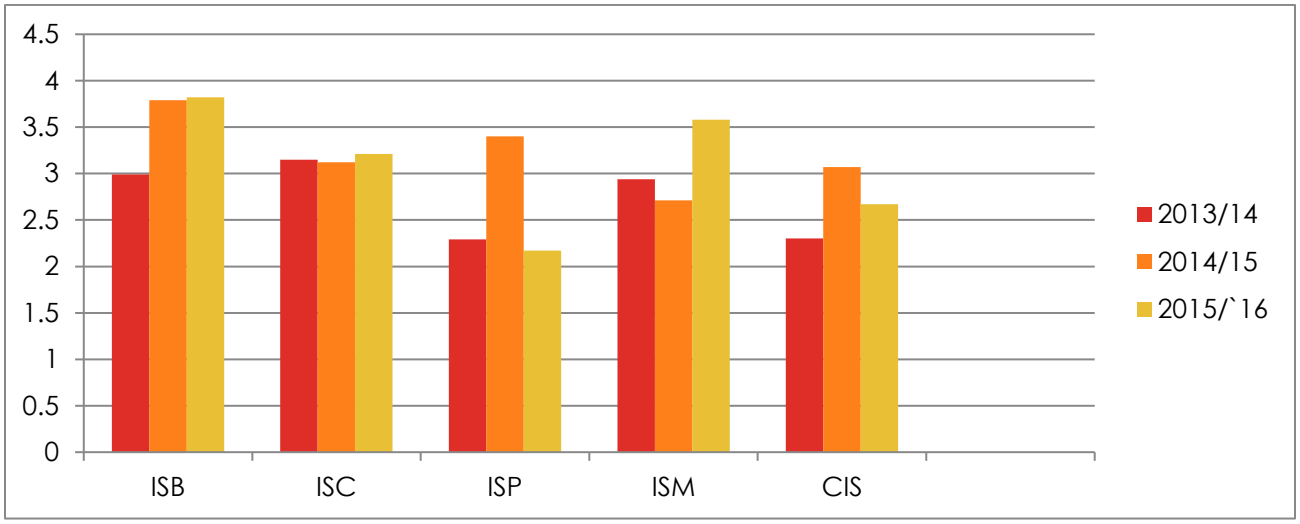
The results for the first session 2015/2016 are as follows for each of the five (5) cohorts.

For Integrated Science/Mathematics **t**he total number of students was twelve (12). There were twelve (12) regular students with no carry over student. There were ten (10) female and two (2) male students. For Integrated Science/Chemistry the total number of students was thirty-three (33). There were thirty-three (33) regular students and no carry over student. There were twenty-nine (29) female and four (4) male students. For Integrated Science/Biology the total number of students was one hundred (100). There were ninety-seven (97) regular students with three (3) carry over student. There were eighty-two (82) female students and eighteen (18) male students. For Integrated Science/Physics the total number of students was twelve (12). There were twelve (12) regular students with one (1) carry over student. There were nine (9) female and three (3) male students. For Computer/Integrated Science **t**he total number of students was twenty-one (21). There were twenty-one (21) regular students with no carry over student. There were thirteen (13) female students and eight (8) male students.

Table 3: Learners' academic performance grades for academic session 2015/16

	GRADES						TOTAL	Grade Point Total (GPT)	Mean GPT
DEPARTMENTS	**A**	**B**	**C**	**D**	**E**	**F**			
Integrated Science/Mathematics	**7**	**0**	**2**	**0**	**2**	**1**	**12**	**43**	**3.58**
Integrated Science/Biology	**43**	**23**	**19**	**4**	**10**	**1**	**100**	**382**	**3.82**
Integrated Science/Chemistry	**9**	**4**	**12**	**2**	**5**	**0**	**33**	**106**	**3.21**
Integrated Science/Physics	**0**	**2**	**5**	**0**	**3**	**2**	**12**	**26**	**2.17**
Computer/Integrated Science	**1**	**4**	**8**	**3**	**5**	**0**	**21**	**56**	**2.67**

Figure 1: Distribution of learners' academic performance grades for the five departments (cohorts) over the three academic sessions



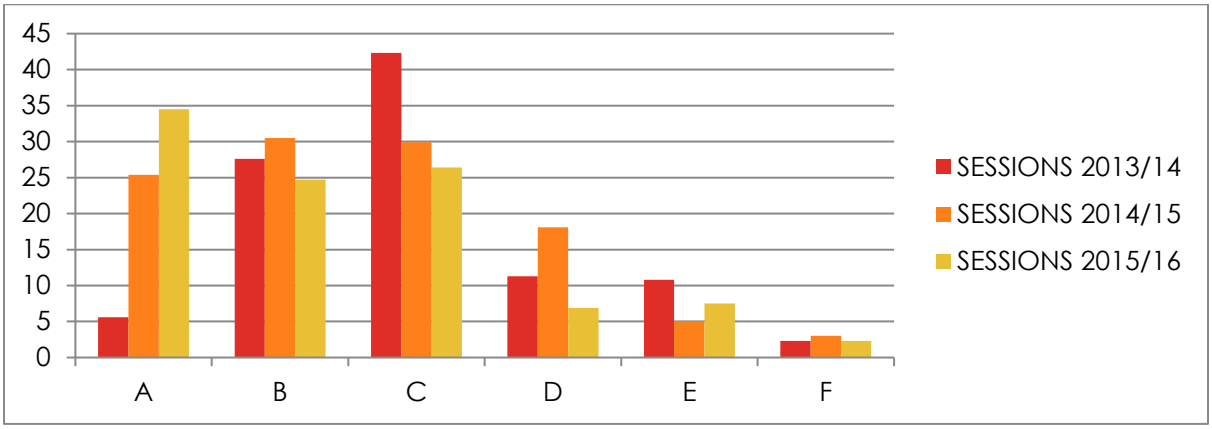
Session Percentages of Learners' Grade

Furthermore, from the use of geometric mean to compare average academic performance of each session, we also decided to compare the scores of the session base on the strength of the learners' academic performance in each academic session. We used a scale of grade strength from A-E, students with 'F' are equal throughout the sessions with most of them writing the course the following session, it becomes plausible to fix the strength of their academic performance in previous year and the new session. Therefore, we decided to neglect 'F' grades. The session percentage of the grades was calculated including 'F' grades which was not attributed any strength to. The grades showing the strength of individual learner were totaled for each session and their percentage ratios across the sessions were also determined.

Table 4: Percentage distribution of learners' academic performance grades for the three academic sessions

COURSE (ISC 124)	SESSION		
GRADES	2013/14	2014/15	2015/16
A	5.6%	25.4%	34.5%
B	27.6%	30.5%	24.7%
C	42.3%	29.9%	26.4%
D	11.3%	18.1%	6.9%
E	10.8%	5%	7.5%
F	2.3%	3%	2.3%

Figure 2: Percentage distribution of learners' academic performance grades for the three academic sessions



Discussion

Stimulating learning interest amongst students extends beyond the use of qualitative research to sample opinion. When learners' participation is well stimulated, commonly it should improve learning ability and academic performance. For the first year of taking the course (course title: component of the environment, ISC 114), the students were taught without an activity manual and workbook. The students result for the session 2013/14 was similar to the results of previous years. In 2014/15 session, the activity manual and workbook was introduced to learners, there was an improvement in the number of students who had upper grades in the course. In the school academic grading system 'A' has the highest strength of 5 points and 'F' with strength of 0. There was 19.8% increase in the percentage of students with 'A' (25.4% in 2014/15 compared to 5.6% 2013/14), and 28.9% increase in 2015/16 academic session compared to 2013/14 academic session. We assumed the 'C' grade as the middle between the upper strength grades(A=5 points, and B=4 points) and lower strength grades (D= 2 points, and E=1 point), the 'F' grade was not considered because less than three percent (3%) of the students had 'F' across the three academic sessions and the number of students having 'F' grades are equal, lastly the 'F' grade has a strength of zero (0), the multiple factor of zero is equal to zero. In 2013/14 academic session, 33.2% of the students have upper strength grades, while 22.1% have lower strength with 42.3% in middle grade. This shows that only a third of the class had good grades while bulk of students in the class are on average grade. In 2014/15 there was significant increase in upper strength grade from previous 33.2% to 55.9% (+22.7%). 23.1% of the students had lower strength grades compared to 22.1% in previous session. There are many factors that came into play while introducing this new teaching method as some of the students depended on past questions and also on their theoretical assessment alone. For the 2015/16 academic session there are 59.2% students in the upper strength grades, also recording more than half of the class like the preceding session, and 14.4% in lower strength grades.

The average total score per session was calculated using geometric mean. The average score for 2013/14 score was 3.06, in 2014/15 it was 3.59, while that of 2015/16 was 3.54. This increase in the succeeding sessions of 2013/14 academic session shows the significant effect of the use of manual on the academic performance of students in the course.

Conclusion

From the analysis and interpretation of data obtained from this study, we can conclude that the relevance of learning resources such as students' workbook cannot be overemphasized. It is a major factor that will aid and stimulate learning interest and learners' participation in the classroom which in turn affect learning ability and have a significant effect on their academic performance.

Recommendation

Instructors should be encouraged to identify possible factors that affect learners' academic performances in their course and proffer possible solutions to the problems. This will in turn serve as area of future research.

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