Use of Google Classroom as Participation and Performance Enhancer Among Basic Science Postgraduates in Some Universities in Nigeria

Julius Olugbenga ADEDAYO[1] & Lois Folasayo AJAYI[2]

[1,2] *Department of Science Education, Faculty of Education, Ekiti State University, Ado-Ekiti, Nigeria.*

Abstract: **The study is an empirical survey of the influence of Google classroom on the participation level and academic performance of Postgraduates in Nigerian Universities. It adopted quasi-experimental research. The targeted population was the Basic Science students at master's level in Nigeria Universities. The sample consisted of 42 postgraduates of Science Education drawn from three Universities in the South Western part of Nigeria through the multistage sampling technique. Out of these, 26 students formed the experimental group while 16 constituted the control group. One research question was raised while five hypotheses were formulated and tested at 0.05 level of significance. There were two research instruments for the study namely the Students' Participation Scale (SPS) and Students' Performance Test (SPT) and there was a package for the Google Classroom Lecture Note designed by the researchers. The instruments were validated by experts in Test, Measurement and Evaluation (TME) and Science Education, all from the Faculty of Education, Ekiti State University, Ado-Ekiti. The reliability of the instruments was done through test re-test reliability test which yielded correlation coefficients of 0.72 and 0.84 respectively at 0.05 level of significance. The administration of the study lasted six weeks in three stages (pretest, treatment and post-test stages). The result of the study revealed that those taught with Google classroom have higher participation mean scores than those in the control group. It also showed that there was a significant difference in the performance mean scores of experimental and control groups. However, no significant difference was noticed in the participation and performance mean scores of male and female postgraduate students in the experimental group.**

Keywords**: Google Classroom, Participation, Performance, Science Education, Postgraduates**

I. INTRODUCTION

The art of teaching is an age-long enterprise in the education sector. The strategy employed by the teacher is pivotal to the effectiveness of the lesson and by implication, the mastery of the contents of the lesson. Various teaching strategies had been in use over the years; however, the emergence of technology has brought innovations into a teaching strategy. Such technology-enhanced tools available recent include webinars, WhatsApp, video conferencing, webpage, zoom, etc.

Of recent, Google devised a few packages that are useful for meetings and collaborating with people through technology. The packages are capable of engendering effective teaching, especially for distant learners. These include AZ screen, Google document, Google meet and Google classroom. These packages have more features that are learners friendly, hence pose to be more convenient tools for distance learning.

Google Classroom is a blended digital learning platform with the major purpose of streamlining the process of sharing learning content between the teacher and the students (Wikipedia, 2022). The Google Classroom was first released by Google on 12th August 2014 and it is easily accessible through the Operating system of Android; iOS and Web Application (Wikipedia, 2021)

The Google Classroom is built with useful features that allow easy posting of announcements to the students, sending lesson contents to students, assigning works to the students like assignments, tests or examinations, grading of students' activities and as well returning students' assessments (Abraham, 2021). The students have the opportunity to upload their assignments to the teacher's view and evaluation. More interestingly, the student's attendance at Google classroom can easily be taken and scored as well. Other activities that are available on the Google classroom platform are video meetings where the teacher and the students can view each other, as a prototype of the physical classroom. Also, the class can be managed and controlled by the teacher while other materials can be added as teaching tools during the lesson such as YouTube videos, a Google Forms survey, and other items from Google Drive. A more interesting feature is the fact that immediate feedback can be given to students' work (Google Support, 2021).

The Google classroom is very useful and has advantages for easy teaching and learning processes. The Advantages of Google Classroom, (Wikipedia, 2015) include being easy to use and accessible from all devices, effective communication and sharing, speeding up the assignment process, effective feedback, no need for paperwork, a clean and user-friendly interface, great commenting system and is useful for everyone. The Google Classroom has made many college and university programmes easier as students can now enrol for online programmes. So, the availability of Google classroom has opened the door for students' translation from the physical classrooms to a better learning management system, especially for higher education programmes (The Tech

Edvocate, 2018). Educators reported that Google classroom provides a collaborative productivity suite which has brought about a profound change in the way they teach and the way students learn. They noted that Google Collaboration fosters problem-solving, teamwork and organization which are the key skills for the modern world (University Business, 2014).

A study that assessed the impact of the Google Classroom Platform on learning at the teacher education level conducted by Gutpa (2021) revealed that the Google classroom is an effective medium of studying, especially at the high institution of learning. He observed that students could easily access the learning materials and activities on the platform and communicate with other students electronically. It was also noted that the students were able to work at their speed on the Google classroom platform as they are opportune to ask questions from their teachers on areas not clear to them. Gutpa (2021) further observed that the teachers could pay more attention to individual differences of the students in Google classroom. In this sense, the students could be monitored properly and assessed accurately.

The use of Google Classroom is an upcoming teaching tool in recent times among the institutions in Nigeria. The upsurge of Covid-19 paves more room for its acceptance and adoption as an alternative means of instruction. The students would be more at advantage by deploying Google classroom into their programme. This study is therefore designed to examine the use of Google Classroom as a participation and performance enhancer among postgraduate basic science students in some universities in Nigeria.

II. STATEMENT OF THE PROBLEM

Postgraduate students are mostly a working-class set of students and they come from scattered located areas in different parts of the country. These factors are constraining factors to their attendance in lecture rooms. In effect, the participation of many of the postgraduate students in lectures is very low as most of the time, they are not available in the class. This consequently affects their academic performances in their course works. On the other side, most of the post-graduate students are busy individuals with their various businesses and jobs, hence, have tight schedules to attend lectures in the school. The family involvement of the female students often deprived them to leave their homes for lectures. All these factors coupled with insecurity on the road transportation are major factors influencing the low participation of the postgraduate students in classes, and their performances. Google Classroom is a teaching technique that makes lectures accessible to students at any location and convenient time. The researchers think that if the Google Classroom is employed in disseminating lectures to the postgraduates, the problems associated with physical availability would be reduced, if not eradicated. This presumes that the participation of postgraduate students at lectures and hence their academic performances can be enhanced through the use of Google Classroom. This study, therefore, examined whether the use of Google Classroom could enhance the participation and performance of postgraduate students of Science Education in some universities in Nigeria.

III. PURPOSE OF THE STUDY

The study examined the use of Google Classroom as a participation and performance enhancer among Postgraduate Basic Science students in Nigeria. Specifically, it investigated the possible influence of the use of Google Classroom on enhancing the participation level and academic performance of Basic Science postgraduate students. It focused on finding out the:

i. level of knowledge of Google Classroom among the Basic Science postgraduate students
ii. level of the students' participation in Google Classroom activities
iii. level of the students' performance in Google Classroom activities
iv. the difference in the participation level of male and female post-graduate students in Google classroom
v. the difference in the performance level of male and female post-graduate students in Google classroom

IV. RESEARCH QUESTIONS

Based on the purpose, the following research question was raised:

1. What is the level of knowledge of Google Classroom among the Basic Science postgraduate students?

V. RESEARCH HYPOTHESES

The following null hypotheses were formulated for the study:

1. There is no significant difference in the pre-test performance mean scores of experimental and control groups.
2. There is no significant difference in the post-test performance mean scores of experimental and control groups.
3. There is no significant difference in the post-test participation mean scores of experimental and control groups.
4. There is no significant difference in the post-test participation mean scores of male and female postgraduate students in the experimental groups.
5. There is no significant difference in the post-test performance mean scores of male and female postgraduate students in the experimental groups.

VI. METHODOLOGY

The study adopted a quasi-experimental design. The sample consisted of 42 postgraduate students of Science Education drawn from three universities in the South Western part of Nigeria through the multistage sampling technique. The first stage was the selection of three universities from South Western Nigeria by random sampling technique, followed by

the selection of postgraduate students of Science Education from the three selected Universities through purposive sampling technique. In all, 42 postgraduate students were sampled where 14, 12 and 16 were sampled in the three Universities respectively. The first two universities were used as the experimental group while the third university served as the control group. Thus, there were 26 students in the experimental group and 16 in the control group. A package for the Google Classroom Lecture Note designed by the researchers based on the concepts in Science Education was used for the study. Three research questions were raised for the study while four hypotheses were formulated and tested at 0.05 level of significance. Two research instruments were used for the study namely the Students' Participation Scale (SPS) and the Students' Performance Test (SPT). Each of the instruments has two sections A and B where Section A bothers on the bio-data of the students such as Name of University, the programme of study, lecture course and gender. Section B of SPS contained 7 items on the participation of the students in the lecture room. Each item was rated zero points for non-participation, 1 point for partial participation and 2 points for full participation. Section B of SPT contained 20 multiple-choice items on the content covered in the study. Each item with the correct option was allotted 1 mark while the item with the incorrect option was scored zero. The instruments were ensured for contents and construct validity by two experts in Test, Measurement and Evaluation and one from Science Education, all from the Faculty of Education, Ekiti State University, Ado-Ekiti. To ascertain the reliability of the instruments, they were subjected to test re-test reliability test of two weeks interval administration and the data obtained were analysed with Pearsons' Product Moment Correlation statistics, which yielded correlation coefficients of 0.72 and 0.84 respectively at 0.05 level of significance. The study was delimited to a postgraduate course offered by Science Education postgraduate students with code ESE 704, titled "Evaluation in Science Education". Four topics were taught during the study which is: types of test, test construction, test reliability and test validity, each occupying a lecture period of the Google Classroom.

The administration of the study took six weeks in three stages. There was a pre-treatment stage of one week where the researchers visited the sampled universities to select the sampled postgraduate students. During this period, the Science Education lecturers who served as the research assistants were contacted and interacted with. The SPT instrument was administered to all the sampled students to obtain their performance of the students before the treatment of the study. This was followed by the treatment stage of four weeks where the package for the Google Classroom Lecture Note was used to teach ESE 704 in the experimental group while the control group was taught physically in the classroom by their regular teacher. During this stage, the SPS instrument was administered to the two groups to assess their level of participation in the class activities. After the teaching stage of four weeks, the last stage of one week of the post-treatment stage witnessed the re-administration of the SPT instrument. It was conducted by the researchers in conjunction with the research assistants. The data obtained from the study from the pre-treatment stage to the post-treatment stage were collated for statistical analysis. The research questions were answered using frequency counts and means while the research hypotheses were analysed using t-test statistics at 0.05 significance level.

VII. RESULTS

Descriptive Analysis

Research Question 1: What is the level of knowledge of Google Classroom among the Basic Science postgraduate students?

Table 1: Frequency counts and percentages of the knowledge level of Google Classroom among the Basic Science postgraduate students

Items	Aware		Not Aware	
	N	%	N	%
I am aware of Google classroom	32	76.19	10	23.81
I have used Google classroom for teaching before	15	35.72	27	64.28
I have used Google classroom for learning before	14	33.33	28	66.67
I have submitted assignments using Google classroom before	16	38.10	26	61.90
Average	**19.25**	**45.83**	**22.75**	**54.17**

From table 1 above, 32(76.19%) of the respondents were aware of Google classroom before while 10 (23.81%) were never aware; 15(35.72%) have used Google classroom for teaching before while 27(64.28%) have not; 14(33.33%) have used Google classroom for learning before while 28(66.67%) have not and 16(38.10%) have submitted assignment using Google classroom before while 26(61.90%) have not. On average, 19.25(45.83%) were aware of Google classroom before 22(54.17%) were not. This means that the level of knowledge of Google Classroom among the Basic Science postgraduate students was low before the study.

Hypotheses Testing

Ho_1: There is no significant difference in the pre-test performance mean scores of experimental and control groups.

Table 2: t-test analysis of the pre-test performances of the experimental and control groups

GROUP	N	MEAN	SD	Df	t	P
A	26	8.08	2.26	40	0.29	0.776
B	16	7.90	2.16			

$p > 0.05$ Not sigt

Table 2 above shows that $t(40) = 0.29$, $p > 0.05$ level of significance. The null hypothesis is therefore not rejected, which means that there is no significant difference in the pre-

test performance mean scores of experimental and control groups. Thus, the two groups are homogeneous before the treatment.

Ho_2: There is no significant difference in the post-test performance mean scores of experimental and control groups.

Table 3: t-test analysis of the post-test performances of the experimental and control groups

GROUP	N	MEAN	SD	Df	t	P
A	26	15.65	2.13	40	10.00	0.000*
B	16	8.94	2.08			

p < 0.05 sigt

It is evident from table 3 that t(40) = 10.00, p < 0.05 level of significance. Therefore, the null hypothesis was rejected, which implies a significant difference in the post-test performance mean scores of experimental and control groups. The means of both groups show a distinct variation as those in the experimental group has a higher mean than those in the control group.

Ho_3: There is no significant difference in the post-test participation mean scores of experimental and control groups.

Table 4: t-test analysis of the post-test participation of the experimental and control groups

GROUP	N	MEAN	SD	Df	t	P
A	26	12.46	1.58	40	11.68	0.000
B	16	6.31	1.78			

p < 0.05 sigt

From table 4 above, t(40) = 11.68, p < 0.05 level of significance. Hence, the null hypothesis is rejected, which means that there is a significant difference in the post-test participation mean scores of experimental and control groups.

Ho4: There is no significant difference in the post-test participation mean scores of male and female postgraduate students in the experimental group.

Table 5: t-test analysis of the post-test participation of male and female students of the experimental group

SEX	N	MEAN	SD	Df	T	P
M	12	12.08	1.58	24	1.14	0.267
F	14	12.79	1.78			

p > 0.05 Not sigt

Table 5 shows that t(24) = 1.14, p > 0.05 level of significance. This means that the null hypothesis was not rejected. Therefore, there is no significant difference in the post-test participation mean scores of male and female postgraduate students in the experimental group.

Ho5: There is no significant difference in the post-test performance mean scores of male and female postgraduate students in the experimental group.

Table 6: t-test analysis of the post-test performances of male and female students of the experimental group

SEX	N	MEAN	SD	Df	T	P
M	12	16.00	1,54	24	0.76	0.455
F	14	15.36	2.56			

p > 0.05 Not sigt

From Table 6, t(24) = 0.76, p > 0.05 level of significance mean that the null hypothesis is not rejected. Thus, there is no significant difference in the post-test performance mean scores of male and female postgraduate students in the experimental group.

VIII. DISCUSSION

The finding of the study showed that the level of the post-graduate students' knowledge of Google classroom before the study was low. This is not unexpected as the platform was recently developed and introduced as a teaching-learning platform (Wikipedia, 2021). So, there is the possibility that the platform is not yet popular among the students. No wonder, the two groups (experimental and control) are homogeneous before the treatment. This means that all the post-graduate students were at the same level of Google classroom awareness before the study. This corroborates the earlier submission on this paper that the use of Google Classroom is an upcoming teaching tool in recent times among the institutions in Nigeria.

The study also revealed that the postgraduate students taught with Google classroom performed higher than those taught with the conventional method in Basic Science. The reason for this variation must have been the advantage of the use of the Google classroom platform which paved way for convenience in learning as the students could easily access the learning materials and activities on the platform and communicate with other students electronically (Gutpa, 2021). More importantly, Gutpa (2021) further pointed out that the teachers could pay more attention to individual differences of the students in Google classroom and that the students could be monitored properly, there is a tendency for the students in Google classroom to perform higher than those in the conventional classroom.

The finding of the study further revealed that there was a significant difference in the participation level of the experimental and control groups. The students taught in the Google classroom participated well in the programme than those taught in the conventional classroom. This outcome aligns with the earlier submission of this paper that Google classroom is an effective medium of studying, especially at the high institution of learning (Gutpa, 2021). The participation of the students could have been enhanced and motivated due to the possibility of video meetings where the

teacher and the students can view each other and the feature for taking students' attendance for scoring at Google classroom. Also, other materials can be added as teaching tools during the lesson such as YouTube videos, a Google Forms survey, and other items from Google Drive is an encouragement and motivation for the students to be interested in attending lectures with the Google classroom.

Lastly, the findings of the study showed that there is no significant difference in the participation and academic performance of male and female postgraduate students taught with Google Classroom. This observation could be because Google Classroom gives room for Collaboration which fosters problem-solving and teamwork (University Business, 2014). Such interaction may have overridden whatever differences that could have existed by gender differences. This implies that Google classroom has the potency of eliminating possible gender differences among students.

IX. CONCLUSION

Based on the findings of the study, it can be concluded that the knowledge level of Google Classroom among the Basic Science postgraduate students was low before the study. The study showed that those students taught with Google classroom performed better than those not taught with the Google classroom platform, same with their participation level. However, there is no significant difference in the participation level and academic performance of male and female postgraduate students taught with the Google classroom platform. Therefore, deploying Google classroom in the postgraduate programme would be advantageous to the teachers, the students and the programme.

X. RECOMMENDATIONS

On the premise of the conclusion of the study, the following were recommended:

i. the awareness of Google classroom should be created by the stakeholders in education, especially at a higher level of education.
ii. the use of Google Classroom should be encouraged for distant students to prevent avoidable travelling risks and expenses.
iii. The network facility needs improvement to avoid network breaks or failures during Google classroom sessions.

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