

Effect of Project-Based Learning Method on Students' Academic Performance in Educational Psychology in Benson Idahosa University, Benin City, Edo State, Nigeria

Agboola, James Odunayo PhD

Department Of Education, Benson Idahosa University, Benin City, Edo State, Nigeria.

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ABSTRACT

This study sought to investigate the effect of project-based learning method on students' academic performance in educational psychology in Benson Idahosa University, Benin City, Edo State, Nigeria. To guide the study, three hypotheses were formulated and were tested at 0.05 alpha level of significance. The pre-test post-test non-equivalent control group quasi-experimental research design used for the study. The population of the study consisted of all level 300 education students in the two campuses of Benson Idahosa University. There are 42 level 300 students in education department as at the time of this study. Twenty six (26) comprising 7 males and 19 females in the heritage campus while sixteen (16) comprising 6 males and 10 females are in the legacy campus of the university. The sample for the study consisted all the forty-two (42) level 300 education students in both campuses of the university. This was because the total number was few and could be manageable. The instrument used for the study was a teacher-made test titled "Educational Psychology Test" (EPT), drawn from the pool of test items on educational psychology from 2020-2022 and was validated by three experts, with reliability index of 0.82. During treatment procedures, the two groups were pretested, the experimental group was taught using the Project-based Learning (PBL) method while the control group was taught using the traditional lecture method and after treatment administration, both groups were post tested and the findings showed that there was no significant difference in the academic performance of students in Educational Psychology in the experimental and control groups before treatment; there is a significant difference in the academic performance of students in Educational Psychology in the experimental and control groups after treatment and there is no significant difference between male and female students' academic performance in Educational Psychology in the experimental group after treatment among secondary school students in Benson Idahosa University, Edo State. Based on the findings therefore, it is recommended that teachers should employ Project-based Learning (PBL) method for effective teaching and learning of educational psychology concepts and all other courses in Benson Idahosa University, Benin City, Edo State.

Keywords: Project-based, Educational Psychology, Students' Achievement, Experimental, Control group

BACKGROUND TO THE STUDY

Higher education institutions play a pivotal role in producing qualified human power that enables solving the real problems of a community (Idris, Hassan, Ya'acob, Gill and Awal, 2012). Education is a powerful agent of change that improves health and livelihoods and contributes to social stability. At the micro-level, it is associated with better living standards for individuals through improved productivity; given that those who have received a higher education tend to have more economic and social opportunities. At the macro level, education builds well-informed and skilled human capital, which has been considered an engine of

economic growth that positively contributes to economic development (Sothan, 2019). However, gaining knowledge, attitudes, values, and skills through education is not a simple task; rather it is a long and challenging trip in life. Students are expected to spend much of their time studying and need to graduate with good academic results especially in psychological course like Educational Psychology.

Educational psychology is one of the core education courses that every education graduate is expected have taken while in college. It covers the concept of education, psychology and educational psychology. It focuses on the teaching and learning process, meaning of learning, theories of learning, motivation, remembering and its theories, forgetting and its theories, transfer of learning and exceptional children. Exposure to educational psychology enables the products of education programme to prepare school leavers to fulfil the expectations of the nation in human capital development as such graduates will be able to transfer theoretical knowledge into practical use when the need arises.

Academic performance in educational psychology as a course is largely depending on the outcome of students' effort in examinations. However, students' academic performance is determined by a number of factors. Studies in the education literature like Hijazi and Naqvi (2006) and Al-Hadrami and Morris (2014) have examined the factors that may influence students' performance. This includes teachers' qualifications and teaching methods.

There are many teaching methods teacher engage in the teaching and learning processes, however, observation still shows that students are performing woefully in their academics. To ameliorate this problem, many teachers have shifted their methods from the traditional system to students-centered system of teaching process but still, the problem persists. There must be ways to solve this challenge and one of these ways is the application of project-based learning method.

Project-based learning (PBL) is a teaching and learning method that drives students' learning by engaging them in real-world, meaningful projects. It's a style of inquiry-based and student-centred learning. In PBL, students work in groups over a set period on a project designed to solve a genuine problem or answer a challenging question. Students demonstrate their knowledge and skills by creating a product or presentation for a public audience. Project based learning activities allow students to develop deep content knowledge. Importantly, PBL also supports development of 21st century skills such as critical thinking, collaboration, creativity and communication. PBL education is used across various learning environments, including high schools and universities.

In the era of digital transformation of education, the new generation of information technologies such as artificial intelligence, big data, and metaverse are bringing great changes to education at an unimaginable speed, and at the same time posing unprecedented challenges to talent training. Cultivating students with higher-order thinking skills that can adapt to the future development of society and reasonably cope with the complex real world has become an important mission in the current education reform and development around the world (Ma & Yang, 2021). Different types of problems produce different teaching methods and also guide the development of students' different thinking skills. Project-based learning, as a new type of teaching and learning method in the context of curriculum and teaching reform, takes real life as the background, is driven by practical problems, breaks the disciplinary boundaries, integrates multiple disciplines into one project, and develops students' future-oriented abilities such as creative thinking, problem raising, problem solving, critical thinking, communication and collaboration, etc. (Zhang & Ma, 2023). The advantages of this approach over traditional teaching and learning models are being recognized and explored. A large number of studies on the effects of project-based learning have been done, but there is no one who had investigated this learning method on any Educational Psychology as a course in Benson Idahosa University, Benin City, Edo State.

To ascertain the efficacy of this pragmatic teaching approach, Zhang and Ma (2023) carried a study to

examine whether project-based learning can effectively improve the learning effect of students. This study uses a meta-analysis method to transform 66 experimental or quasi-experimental research papers based on project-based learning over the past 20 years into 190 effect values from the sample size, mean, and standard deviation of experimental data during their experiments, and to conduct in-depth quantitative analysis. The results of the study showed that compared with the traditional teaching model, project-based learning significantly improved students' learning outcomes and positively contributed to academic achievement, affective attitudes, and thinking skills, especially academic achievement.

In the same vein Wafula and Odhiambo (2016) investigated the influence of project based learning technique on achievement of students in classification of organisms among Secondary Schools in Kenya with particular focus on academic achievement and attitude development. Quasi experimental design was employed. Stratified random sampling technique was used to select eight classes from four secondary schools with a total of 360 students. Students' Attitude Questionnaires and Classification Achievement Test were used as instruments. Analysis of Variance and t-test were employed in data analysis. The study revealed that project based learning technique enabled students to improve in academic achievement as well as developing positive attitude towards classification of organisms

In their study, Ibrahim, Yunus and Yusuf (2015) investigated the effects of the Project-Based Learning (PBL) method on undergraduate students' achievement and its association with these students' self-efficacy beliefs about science teaching and pinions about PBL. The sample of the study consisted of two randomly chosen classes from a set of seven classes enrolled in the Science Teaching Course in a Primary School Education Department of a State University in Turkey. The randomly assigned treatment group (n =33) was instructed based on a PBL method. The control group (n = 33) was instructed through the use of a traditional teaching (TT) method. The Science and Technology Teaching Achievement Test (STTAT) and self-efficacy belief scale (SEBS) were used as pre- and post-test measures. The results showed that students in the treatment group produced better performance on the Post- SEBS and the Post-STTAT. The students in the treatment group expressed mostly positive opinions about the use of the Project-Based Learning method.

Vas, Quinn, Heinricher and Rissmiller (2013) investigated long-term impacts of project-based learning (PBL) by studying 38 years of engineering graduates from Worcester Polytechnic Institute, a technology-focused university featuring a project-based curriculum. Web-based, asynchronous interaction with a stratified sample of alumni informed survey development. A Likert scale survey explored 39 areas of professional and personal impact of PBL experiences. Impact areas included professional skills, world views, and personal impacts. For each of 39 impact areas of PBL that the survey explored, a higher percentage of females reported "much" or "very much" positive impact when compared to males. Mann-Whitney U tests revealed that the differences in distributions were statistically significant for 34 of the 39 impacts ($p < .015$). This paper presents and discusses detailed findings regarding gender differences in long-term impacts of PBL on engineering majors. The discussion is informed by findings from post-survey interviews with male and female alumni.

Morealso, Eze, Onwusuru and Ginigeme (2021) *conducted to ascertain the gender-relative effect of project-based learning method on academic achievement and retention of technical college students in Basic Electricity. The study was carried out in Anambra state and adopted the quasi-experimental research design. This was precisely, pretest, posttest, delayed posttest non-randomized control group design which involved groups of students in their intact classes. A sample of 92 NTC II students was drawn from a population of 179 students of state owned technical colleges in Anambra state. Two research questions and two null hypotheses tested at 0.05 level of significance guided the study. Basic Electricity Achievement Test (BEAT), a 40-item multiple choice test which was based on the units covered in the study, served as the instrument used for data collection. The BEAT and lesson plans for both control and experimental groups were all validated by three experts from the faculty of education, Nnamdi Azikiwe University Awka. The reliability coefficient of the instrument was found to be 0.82 using KR-20. Mean and standard deviation*

were used to answer the research questions, while Analysis of Covariance (ANCOVA) was employed to test the hypotheses. Findings revealed that male and female technical college students taught Basic electricity using project-based learning method had higher achievement and retention scores than those taught using the conventional teaching method. Also findings revealed that there was no significant difference in the mean achievement and retention scores of the male and female students taught basic electricity using PBLM.

If education is geared towards equipping the individuals to be relevant in the society and research has found that project-based learning method could help in curbing the academic mess among students and Educational Psychology prepares student-teachers to fulfill the significant expectations of the nation as regards human capital development, then there is dare to employ this learning method to examine its effect on students' academic performance in Educational Psychology in Benson Idahosa University, Benin City, Edo State.

STATEMENT OF THE PROBLEM

The observation that academic performance of students in Benson Idahosa University (BIU) in the psychological courses, educational psychology in particular, has been generally poor (Exams and Records, 2020-2022) necessitated the study. Exams and Records division (2020-2022) points out that failure or lack of understanding of some concepts or topics in educational psychology such as the theories of learning, transfer of learning, remembering and forgetting and implications for teaching and learning were common. Teachers have been teaching this course through the traditional teaching method with textbooks and current course materials but the failure rate is still high and if this continues, the students may not understand these important concepts and this could deprive them of achieving their academic and educational goals. So, there would be a need of a pragmatic teaching approach that would foster a drastic understating of the course and those topics in particular. The statement of the problem therefore is: what is the effect of project-based learning method on educational psychology among Education Students in Benson Idahosa University, Benin City, Edo State?

Hypotheses

1. There is no significant difference in the academic performance of students in Educational Psychology in the experimental and control groups before treatment
2. There is no significant difference in the academic performance of students in Educational Psychology in the experimental and control groups after treatment
3. There is no significant difference between male and female students' academic performance in Educational Psychology in the experimental group after treatment

METHODOLOGY

A pre-test post-test non-equivalent control group quasi-experimental design was used for the study. One independent variable (Project-based Learning Method) was involved in this study, one (01) intervening variable (sex) and one dependent variable (Academic performance in Educational Psychology). These intervening variables (sex) is of two levels and was used to determine their gender. The independent variable is manipulable variable and the samples were exposed to the different methods respectively. As a result, treatment was only given to students at the pretest level and were also post tested. The independent variable of the study was Project-based Learning Method. This variable was manipulated through the sensitization and training of students in the experimental group using the project-based learning approach and the control group was taught using the lecture method.

Fig. 1: Showing the Design Over Variables

Groups	Design
Experimental Group	O_1 _____ X_1 _____ O_2
Control Group	O_1 _____ X_2 _____ O_2

Key: O_1 & O_2 is pre-test and post test.

_____ No randomization of subjects to groups.

X_1 is used for project-based learning method

Population of the study

The population of the study consisted of all level 300 education students in the two campuses of Benson Idahosa University. There are 42 level 300 students in education department as at the time of this study. Twenty six (26) comprising 7 males and 19 females in the heritage campus while sixteen (16) comprising 6 males and 10 females are in the legacy campus of the university. (**Departmental Office**)

Sample and Sampling Technique

The sample for the study consisted all the forty-two (42) level 300 education students in both campuses of the university. This was because the total number was few and could be manageable. So, there was no need for any sampling technique. Since the university was of two campuses (Heritage and Legacy), the heritage campus was assigned School A and was labelled as the experimental group while the legacy campus was assigned school B and was labelled the control group.

Research Instrument

The instrument used for the study was a teacher-made test titled “Educational Psychology Test” (EPT), drawn from the pool of test items on educational psychology from 2020-2022. The first section of the test requests for the gender of the students, the second part consisted of twenty (20) objective questions on theories of learning, transfer of learning, remembering and forgetting while the last section of the instrument consisted of an essay test item on theories of learning, transfer of learning, remembering and forgetting respectively.

Validity of the Instrument

In order to validate the instrument, drafted copies were given to the three experts, two in Measurement and Evaluation while the other in the field of Counselling Psychology to ascertain its validity. Suggestions and corrections made by the two experts were inculcated into the final draft of the instrument and this made the instrument valid.

Reliability of the instrument

In establishing the reliability of the instrument used for this study, firstly, the test-re-test method was used. In using this procedure, the researcher administered twenty (20) copies of the instrument to level 300 education students in University of Benin, Benin City, and after three weeks, the same instrument was re-administered to the same students. The scores collected at the first and the second administration of the instrument were analyzed, using Pearson Product Moment correlation statistical procedure to determine its reliability and it had an r-value of 0.82. This showed that the instrument was reliable since the r-value was higher than 0.70.

Treatment Procedure

Step I: Pre-Testing

The two groups were pre-tested on the first two days using the Educational Psychology Test (EPT).

Step II: Treatment Packages

Sensitization of the students in Group A using the Project-based Learning (PBL). Method

In order to sensitize the experimental group using the PBL, the researcher took the experimental group students through the following sessions.

Session 1: In this session, the following sub-heading were discussed: the concept of project-based Learning (PBL) Method

Session 2: Formulating the expected outcomes in educational psychology

Session 3: Understanding the concepts of teaching materials in educational psychology

Session 4: Skill training and the designing the project theme

Session 5: Making the project proposal in educational psychology

Session 6: Executing the tasks of projects and presentations of project report

Session 7: Questioning and Answering

Step III: Post-test

Control group was exposed to lecture method and was also post-tested

Control of Extraneous Variables

Extraneous variables are variables which could pose serious damages to the internal validity of an experimental design when they are not controlled. So, the researcher maintained confidentiality throughout the treatment sessions to minimize adulterations of the results or findings. The identified extraneous variable in this study include:

Attrition/Experimental Mortality

The participants were encouraged and sensitized to be punctual and regular to all session with the promise of regular refreshments throughout the periods of meetings. This was discussed before the commencement of the sessions.

Subject Bias

This was controlled by not disclosing the nature of the experiment to the participating students. In other words, they did not know whether they were in the treatment or control group since the participant's perception of the nature of the study could affect the outcome

Experimental Expectancy Effects

This was controlled by the researcher as he used a standard pattern in presenting the different treatment packages and detailed explanation of questions on the various treatment packages was used.

Experimenter Bias

To control for this by the researcher, the treatment package designed for each of the groups was strictly followed.

Administration of Instruments

The instrument titled “Educational Psychology Test (EPT) was administered as pre-test, followed by the treatment. The experimental groups was taught using PBL approach by the researcher in school A and lecture method was used to teach same topics to the students in the control group in school B. And at the end of the treatment, both the experimental and the control groups were post tested using the same test items (EPT) by the researcher and the scores were recorded immediately.

Method of Data Analysis

In analyzing the data collected, all research questions were answered using the descriptive statistics of mean, standard deviation and percentage count while all the hypotheses were tested using the students’ independent t-test Statistics at 0.05 alpha level of significance.

DATA ANALYSIS AND RESULTS

Testing of Hypotheses

Hypothesis 1: There is no significant difference in the academic performance of students in Educational Psychology in the experimental and control groups before treatment

The summary of the test of this hypothesis is presented in table 1

Table 1: t-test statistics on the difference in the academic performance of students in Educational Psychology in the experimental and control groups before treatment

GROUPS	N	t	Mean	Mean diff.	df	Sig.(2-tailed)	Decision
EXPERIMENTAL	26		22.8				
		0.84		0.37	40	0.4	Accept Ho
CONTROL	16		22.43				

Table 1 shows that the observed difference in the academic performance of students in Educational Psychology in the experimental and control groups before treatment is not significant at 0.40 ($t = 0.84$; $df=40$). Since 0.40 is higher than 0.05, the observed difference in the academic performance of students in Educational Psychology in the experimental and control groups before treatment is not significant. With this, the null hypothesis which says there is no significant difference in the academic performance of

students in Educational Psychology in the experimental and control groups before treatment is accepted. This showed that there is no significant difference in the academic performance of students in Educational Psychology in the experimental and control groups before treatment in Benson Idahosa University, Edo State.

Hypothesis 2: There is no significant difference in the academic performance of students in Educational Psychology in the experimental and control groups after treatment

The summary of the test of this hypothesis is presented in table 2

Table 2: t-test statistics on the difference in the academic performance of students in Educational Psychology in the experimental and control groups after treatment

GROUPS	N	t	Mean	Mean diff.	df	Sig.(2-tailed)	Decision
EXPERIMENTAL	26		47.38				
		9.9		20.07	40	0	Reject Ho
CONTROL	16		27.31				

Table 2 shows that the observed difference in the academic performance of students in Educational Psychology in the experimental and control groups after treatment is significant at 0.00 ($t = 9.90$; $df=40$). Since 0.00 is less than 0.05, the observed difference in the academic performance of students in Educational Psychology in the experimental and control groups after treatment is significant. With this, the null hypothesis which says there is no significant difference in the academic performance of students in Educational Psychology in the experimental and control groups after treatment is not accepted. This showed that there is a significant difference in the academic performance of students in Educational Psychology in the experimental and control groups after treatment in Benson Idahosa University, Edo State.

Hypothesis 3: There is no significant difference between male and female students' academic performance in Educational Psychology in the experimental group after treatment.

The summary of the test of this hypothesis is presented in table 3.

Table 3: t-test statistics on the difference between male and female students' academic performance in Educational Psychology in the experimental group after treatment

GENDER	N	t	Mean	Mean diff.	df	Sig.(2-tailed)	Decision
MALE	7		47.71				
		0.32		0.45	24	0.74	Accept Ho
FEMALE	19		47.26				

Table 7 shows that the observed difference between male and female students' academic performance in Educational Psychology in the experimental group after treatment is not significant at 0.74 ($t = 0.32$; $df=40$). Since 0.74 is higher than 0.05, the observed difference between male and female students' academic performance in Educational Psychology in the experimental group after treatment is not significant. With this, the null hypothesis which says there is no significant difference between male and female students' academic performance in Educational Psychology in the experimental group after treatment is accepted. This showed that there is no significant difference between male and female students' academic performance in Educational Psychology in the experimental group after treatment among secondary school students in Benson Idahosa University, Edo State.

DISCUSSION OF FINDINGS

Three significant findings are obtained from this study.

- The first finding revealed that there is no significant difference in the academic performance of students in Educational Psychology in the experimental and control groups before treatment in Benson Idahosa University, Edo. This may be because all the students share same and common challenges in the learning of educational psychology concepts and topics and every other characteristics as peers in the same academic level
- The second finding in this study showed that there is a significant difference in the academic performance of students in Educational Psychology in the experimental and control groups after treatment in Benson Idahosa University, Edo State. This finding is in line with the finding of Zhang and Ma (2023) who studied the impact of project-based learning on student learning effects: a meta-analysis study and found that project-based learning significantly improved students' learning outcomes and positively contributed to academic achievement, affective attitudes, and thinking skills, especially academic achievement when compared with the traditional teaching model. The finding is also in line with the finding of Wafula and Odhiambo (2016) who investigated the influence of project based learning technique on achievement of students in classification of organisms among Secondary Schools in Kenya with particular focus on academic achievement and attitude development and found that project based learning technique enabled students to improve in academic achievement as well as developing positive attitude towards classification of organisms.

In the same vein, the finding agrees with that of Ibrahim, Yunus and Yusuf (2013) who studied to investigate the effects of the Project-Based Learning (PBL) method on undergraduate students' achievement and its association with these students' self-efficacy beliefs about science teaching and pinions about PBL and the results showed that students in the treatment group produced better performance on the Post- SEBS and the Post-STTAT. The students in the treatment group expressed mostly positive opinions about the use of the Project-Based Learning method.

- The third finding in the study revealed that there is no significant difference between male and female students' academic performance in Educational Psychology in the experimental group after treatment among secondary school students in Benson Idahosa University, Edo State. This finding is in contrast with the finding of Vas, Quinn, Heinricher and Rissmiller (2013) who investigated long-term impacts of project-based learning (PBL) by studying 38 years of engineering graduates from Worcester Polytechnic Institute and discovered that a higher percentage of females reported "much" or "very much" positive impact when compared to males. Mann-Whitney U tests revealed that the differences in distributions were statistically significant for 34 of the 39 impacts ($p < .015$). Furthermore, the finding is in consonant with that of Morealso, Eze, Onwusuru and Ginigeme (2021) who *conducted their study to ascertain the gender-relative effect of project-based learning method on academic achievement and retention of technical college students in Basic Electricity Anambra State and discovered that there was no significant difference in the mean achievement and retention scores of the male and female students taught basic electricity using PBLM.*

CONCLUSION

It can be concluded from the study that Project-based Learning Method (PBL) is effective in the the teaching and learning of educational courses and all other courses in Benson Idahosa University, Benin City, Edo State.

RECOMMENDATION

Based on the findings therefore, it is recommended that teachers should employ Project-based Learning Method (PBL) for effective teaching and learning of educational courses and all other courses in Benson Idahosa University, Benin City, Edo State.

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