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An exploration of blended learning and university students' academic performance

*Olabanji E Obadara [a]

[a] Department of Educational Management, Tai Solarin University of Education, Nigeria

ABSTRACT

The study examined the effect of blended learning approach on undergraduate students' academic performance. The study adopted quasi-experimental research design. A sample of (84) 300 level students of Educational Management in Tai Solarin University of Education, Ijebu-ode, Ogun State Nigeria was drawn using purposive sampling technique. The sample was divided into two study groups 42 students in each group; the two groups were randomly assigned to be treated differently as experimental group (blended e-learning environment) and control group (traditional face-to-face teaching approach). The pre-test was administered to both groups. After all the essential topics were covered, post-test was given to both groups. The test scores were collated and subjected to statistical analysis to determine the level of performance of the two groups in the course (EDM 316). Analysis of covariance (ANCOVA) was used to determine the main and interaction effects of the variables of study. The hypotheses developed for the study were tested at the .05 level of significance. The findings revealed significant main effect of treatment (blended learning approach) on undergraduate students' academic performance, and no significant gender difference in the effect of blended learning approach on undergraduate students' academic performance. The study equally recorded a significant mean difference between experimental and control groups. It was therefore recommended among others that blended learning should be adopted for teaching at university level for the purpose of helping students to be thoughtful learners as the approach makes learning environment more conducive, customized and personalized.

Keywords

Blended e-learning environment, Traditional learning, Academic performance, Teaching, E-learning

Corresponding Author

Olabanji E. Obadara

doctorobadara@yahoo.co.uk

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Introduction

The use of Internet technology has introduced a phenomenal change to the delivery of quality teaching and learning in every part of the world today. The concept of e-learning emerged as a result of the integration of information and communication technology (ICT) into the education fields, which indeed results in universal access to education. Many higher education institutions today have multiple modes of teaching delivery such as Programmed Instruction (PI), Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), Computer Based Training (CBT), Learning Management System (LMS), Web-based Learning etc. There is no doubt that some of the pitfalls in these applications of ICT to the delivery of education necessitate the introduction of "*Blended Learning*". This assertion is supported by Azizan (2010), who wrote that the best goal of blended instruction was to overwhelm drawbacks of pure

online instruction. Since either pure e-learning or traditional learning hold some weaknesses and strengths, it is better to mix the strengths of both learning environments to develop a new method of delivery called blended learning.

Blended learning, otherwise called hybrid or mixed learning combines e-learning and classical learning environments. It combines face-to-face and online experiences to occupy learners, and makes learning an exercise beyond the classroom walls. Staker and Horn (2012) defined blended learning as a formal education programme in which a student learns at least in part through online delivery of content and instruction with some elements of student control over time, place, path, and/or pace and at least in part at a supervised brick-and-mortar location away from home. While Garrison and Vaughn (2008) described the basic principle of blended learning as a situation where face-to-face oral communication and the online written communication are optimally integrated so that the strengths of each are blended into a unique learning experience congruent with the context and intended educational purpose. Also, blended programmes are seen as enhancing faculty and student satisfaction through a more efficient use of learning time (Wallace & Young, 2010).

Purpose of the Study

The study examined the effect of blended learning approach on undergraduate students' academic performance. This research study is specifically interested in the investigation of students' academic performance before and after the adoption of blended learning in delivery of a course (EDM 316: Legal Aspects of School Operation) at undergraduate level. This is to ascertain whether blended learning could yield the same, if not better academic performance as compared with traditional classroom learning (conventional lecture method) so as to make recommendations on the use of blended learning approach in Nigerian Universities.

Literature Review

Blended Learning

Osguthorpe and Graham (2003) emphasized six objectives of blended learning design as: pedagogical richness, access to knowledge, social interaction, personal agency, cost effectiveness, and ease of revision. Friesen (2012) cited in Akpan. and Aminikpo (2017) classified blended learning generally into five models namely: Station-Rotation Model, Laboratory-Rotation Model, Flex Model, Self-blend Model, and the Flipped Classroom Model. He stated that the station-rotation model gives students the opportunities to rotate around or between a given stations. And the students rotate on a fixed schedule or at the teacher's discretion among classroom-based learning modalities. In laboratory-rotation model, according to Friesen, an online lab model is developed where an online course is delivered in a physical classroom or in a computer lab without direct instruction from a face-to-face teacher. The flex blended learning model on the other hand is a model in which the curriculum is delivered through an online content provider with classroom teachers providing onsite support. While the self-blend model also known as the "*a la carte*" model allows students to design their educational experience by selecting specific online courses to supplement their traditional in-school coursework. Finally, flipped classroom model involves a rotation model in which the students rotate on a fixed schedule between online delivery of content and instruction, generally outside of the classroom, and face-to-face teacher-guided practice (or projects), generally in a classroom setting (Christensen, Horn & Staker, 2013).

Al-Hasan (2013) conducted a study on the effectiveness of using the blended learning on the academic achievement in the biology course among the second graders in the private secondary schools in Um Aldurman and their trends towards it. The study randomly sampled 41 students from the private secondary schools; they were divided into two unequal groups: experimental consisting of (26) students who studied through the blended learning technology, and the control group consisting of (25) who were taught in the traditional method. Data were collected by using two tools: achievement test and a questionnaire to measure the trend towards blended learning. Through the data analysis, the study concluded that there are statistically significant differences in favour of the students who have studied through the blended e-learning (the experimental group) and that there are statistically significant positive trends among the members of the sample who responded to the items of the questionnaire of the trend measurement towards blended learning.

In a study conducted by Darrin (20l8) on blending learning behaviour and on university students' academic performance in Thailand with a sample size of 181 students from 13 different courses offered at the university. A cross-sectional design was employed by extracting data from the learning management system of the study site, and t-test, ANOVA, and multiple regressions were used for the analysis. The results indicated that there is a weak relationship between blended learning behaviour and academic performance. Absences were significant but tardiest and click use of the learning management system were not significant. This implies that benefits of blended learning are found in other ways than in their relationship with academic performance. Obiedat, Eddeen, Harfoushi, Montaha, Koury, & Alassaf (2014) cited in Payal. (2019) also conducted study on effect of blended-learning on academic achievement of students in the University of Jordan. A sample of 427 students from King Abdulla II School for Information Technology at Jordan University was randomly selected. The arithmetic average, standard deviation statistics and Pearson correlation matrix were used for the analysis. The results of the study recorded that there was a significant and positive impact of blended learning on academic achievement of the students in university of Jordan.

Similarly, Vo, Zhu, and Diep (2017) conducted study on the effect of blended learning on student performance at course-level in higher education using a meta-analysis. A significantly higher mean effect size was found in STEM disciplines compared to that of iron-STEM disciplines. Nevertheless, the weighted mean effect sizes revealed no significant differences regarding of end-of-course assessment methods, namely one-moment and multiple-component assessment. The finding confirmed that blended learning is significantly associated with greater learning performance of STEM disciplined students than with traditional classroom practice. Also, Ceylan and Kesici (2017) conducted a study on effect of blended learning to academic achievement. This study was carried out with a total of 53 students enrolled in the experimental group and control group in the 6th grade classrooms in a middle school in southwest part of Turkey. The study adopted quantitative method design. Academic achievement test and product evaluation scale were used as quantitative data collection sources. Quantitative data was collected through the evaluation of student's projects that they developed during the process of the study and the academic achievement tests. Independent t-test, frequency and ANOVA tests were used for data analysis. The study concluded in accordance with its results that blended learning environment had generated a significant difference in students' academic achievement on behalf of experimental group.

Students' Academic Performance

Several factors have been identified by numerous scholars as factors influencing undergraduate students' academic performance, which vary from institutional factors; environmental and home factor; that is, type of parenting, and socio-economic status of students' parents to student factor. Studies have identified study habit, student's self-concept, teacher's qualification, teaching method, school environment, funding or resource availability, allocation and utilization, government policy etc. as factors influencing academic performance of students. In similar vein, Hijazi and Naqvi (2006) claimed that students' academic performance in higher education is influenced by various socioeconomic, psychological, and environmental factors. It is always in the best interest of educators to measure students' academic performance. This allows them to evaluate not only students' knowledge levels but also the effectiveness of their own teaching processes, and perhaps, provide a gauge of student satisfaction (Martirosyan, Saxon, & Wanjohi, 2014).

Crosnoe, Johnson and Elder (2004) identified 32 factors that could influence students' performance, and they include: fear; anxiety; confidence; concentration; health and wellbeing, social factors: peer group; family background; religion; home problems like broken home; infrastructure for learning; personal or family crisis, economic factors: financial problem and stress, environmental factors: good learning environment; class size; environmental condition; teaching and training method, personal factors: lack of reading habit and reading plan; unwillingness to assume full responsibility; playing and wasteful time spending; interest in a course; lack of self-discipline; procrastination; lack of desire, decision and determination; bad attitude towards school; lack of initiative and use of imagination; poor literacy skills of students; lack of self-discipline; lack of maturity; laziness or apathy; inadequate or poor examination preparation, academic factors: lack of provision of a bridge between theory and practical; heavy course workload.

Adeyemi and Uko-Aviomoh (2004) observed that the curriculum planning and physical expansion without adequate and sustainable human and material resources would definitely fail to produce the desired results. The ability of higher institutions to produce quality graduates depends largely on the quantity and quality of teachers available. Ephraim (2004) opined that Nigerian public institutions have high enrolments without enough qualified instructors and this has resulted to the worsened situation of staff/student ratio which is to the detriment of student's learning and academic performance. While Ajila and Olutola (2007) believed that the state of the home influences the individual since the parents are the first socializing agents in an individual's life. This is because the family background and context of a child affect his reaction to life situations and his level of performance. Okioga (2013) surveyed 186 college students and found that students' socio-economic background influences academic performance. He stated that families with a relative low income tend not to take an active role during their children's education, causing them a sense of constrain which, at the end, influences negatively their performance in higher education.

In a study carried out by Singh, Malik and Singh (2016), they found that there was positive and statistically significant impact of learning facilities, communication skills and proper guidance from parents on student academic performance. Kizito, Munyakazi and Basuayi (2016) examined the factors affecting student success in a first-year mathematics in South Africa. The found workload as the factor which was having the greatest impact on student's performance, followed by the matriculation examination score. Whereas, Frimpong, Agyeman and Ofosu (2016) found out that the interruption of electricity supply, overcrowded lecture

rooms, unfavourable learning environment were significant factors influencing students' performance. Lepp, Barkley and Karpinski (2014) investigated the relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students and found out that cell phone use/ texting was negatively related to grade point average (GPA) and positively related to anxiety. While Talib and Sansgiry (2012) identified that academic and test competence, time management, and test anxiety were significantly related to students' academic performance. Also, Shathele and Oommen (2015) investigated the factors influencing the academic performance of the female medical students in preclinical and clinical years. They found out that facility available for study, family support, and awareness about the course had positive influence whereas anxiety, stress and lack of sleep had negative influence on students' academic performance. In contrary to the above, Enu and Nkum (2015), who conducted study on the factors influencing students' mathematics performance in some selected colleges of education in Ghana found that inadequate teaching, learning materials, self-motivation and lecturer method of instruction were some of the factors that influence students' performance.

Another interesting variable influencing academic performance, which is not broadly researched, is working while in college. Astin (1993) stated that there is a negative relationship between academic performance and working, either the job is full-time or part-time. He pointed out that working hours decrease the students' involvement in campus activities. However, most of the studies have shown that paid work has a non-linear effect on academic performance. Therefore, there is a working-hour threshold that when the hours devoted to work overcome that threshold, students tend to decrease their academic performance. Applegate and Daly (2006) found that working more than 22 hours per week has a negative impact in academic performance. While Ruesga-Benito, da Silva Bichara & Monsueto (2014) have found that students working at least 15 hours per week are prompt to have a more negative academic performance than the ones that do not work.

Hypotheses

The following hypotheses were developed and tested in this study.

Ho_1: There is no significant main effect of treatment (blended learning approach) on undergraduate students' academic performance.

Ho_2: There is no significant gender difference in the effect of blended learning approach on undergraduate students' academic performance. .

Research Procedure

This study used quasi experimental research design because there were only two groups involved in the study, the experimental group and the control group. Hence, this design was used to obtain data from the sample of the population and to establish the effect of blended learning approach on undergraduate students' academic performance. The conceptual model of the design is as follows:

$O_1 – X_1 - O_3$ – Experimental group

$O_2 – X_2 - O_4$ – Control group

Where O_1, O_2 refers to the pre-test observations of both treatment and control group respectively, O3, and O_4 refers to the post-test observations of treatment and control group respectively.

The sample consisted of (84) 300 level students of Educational Management in Tai Solarin University of Education, Ijebu-ode, Ogun State Nigeria. The sample was divided into two study groups 42 students in each group; the two groups were randomly assigned to be treated differently as experimental group (blended e-learning environment) and control group (traditional face-to-face teaching approach). Two types of treatment approaches were involved in this research, traditional and blended online approaches.

The Control Group (***Traditional/Conventional Teaching Setting***): The size of this group was (42) students. Those students were in a traditional/conventional lecture setting, which is through face–to–face oral communication session. The students scheduled to meet with the lecturer twice a week. The students in this type of lecture were taught orally and visually by listening, seeing and interacting with the lecturer over the content material presented in the classroom settings. In addition, they have textbook written by the researcher on the course.

The Experimental Group (***Blended Learning Approach***): The size of this group was also (42) students, they equally meet twice a week. They were instructed through a blended e-learning approach in which they had a chance to read their textbooks before class. This blending learning approach includes: online learning engagement/web based learning, that is, the use of online materials, and learning content management system.

The pre-test was administered to both groups. After all the essential topics were covered, post-test was given to both groups. The test scores were collated and subjected to statistical analysis to determine the level of performance of the two groups in the course (EDM 316: Legal Aspect of School Operation). Analysis of covariance (ANCOVA) was used to determine the main and interaction effects of the variables of study. While the hypotheses developed for the study were tested at the .05 level of significance.

Presentation of Results

The results of the study are presented according to the postulated research hypotheses.

Ho_1: There is no significant main effect of treatment (blended learning approach) on undergraduate students' academic performance.

Table 1: Effect of Treatment (Blended Learning Approach) and Gender on Undergraduate Students' Academic Performance

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2173.401a	7	310.486	3.755	0.002
Intercept	6066.069	1	6066.069	73.372	0
Group	1647.21	1	1647.21	19.922	0
Gender	60.144	1	60.144	0.727	0.396
Pretest	317.972	1	317.972	3.846	0.054
group *gender	35.926	1	35.926	0.435	0.512
group *pretest	176.255	1	176.255	2.132	0.148
group *gender *pretest	64.954	2	32.477	0.393	0.677
Error	6283.302	76	82.675		
Total	237573	84			
Corrected Total	8456.702	83			

a. R Squared = .257 (Adjusted R Squared = .189)

Table 1 above reveals the main and interaction effects of the blended learning approach on undergraduate students' academic performance. There is significant main effect of the experimental treatments (group) which yield (F = 19.922; p<0.05). Also, there is no significant interaction effect of group and gender (F = .435; p>0.05).

Table 2 : Effect of Treatment (Blended Learning Approach) on Undergraduate Students' Academic Performance

Source	Sum of Squares	Df	Mean Square	F	Sig.
Contrast	1647.057	1	1647.057	19.922	0
Error	6283.302	76	82.675		

The F tests effect of group. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

Table 2 above shows a univariate F – ratio of 19.922 significant at p<0.05 level. The hypothesis, which states that there is no significant main effect of treatment (blended learning approach) on undergraduate students' academic performance, is rejected. Thus, there is significant main effect of treatment (blended learning approach) on undergraduate students' academic performance. This means that blended learning approach is effective at improving students' academic performance.

Table 3: Estimated Marginal Means of Experimental and Control Group

Group	Means	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Experimental group	56.838[a]	1.412	54.026	59.649
Control group	47.941[a]	1.407	45.138	50.744

[a] Covariates appearing in the model are evaluated at the following values pretest = 48.5714

Table 3 reveals the mean scores of the experimental and the control group. It shows that the experimental group had a mean score of (56.838) which is higher than the mean score of the control group (47.941). To determine the difference in the means, pairwise comparison was done and presented in Table 4 below.

Table 4 : Pairwise Comparison of the Mean Scores of Experimental and Control Group

(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig[b].
experimental group	control group	8.897*	1.993	.000
control group	experimental group	-8.897*	1.993	.000

Based on estimated marginal means
* The mean difference is significant at the .05 level
[b] Adjustment for multiple comparisons: Less Significant Difference (equivalent to no adjustments).

Table 4 above shows that experimental and control groups had a mean difference (I-J) of (8.897*; P<0.05), meaning that the mean difference between the two groups is highly significant.

Ho_2: There is no significant gender difference in the effect of blended learning approach on undergraduate students' academic performance.

Table 5: Gender Difference in Effect of Treatment (Blended Learning Approach) on Undergraduate Students' Academic Performance

Source	Sum of Squares	Df	Mean Square	F	Sig.
Contrast	23.131	1	23.131	.280	.598
Error	6283.302	76	82.675		

The F tests effect of gender. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

Table 5 above shows a univariate F – ratio of .280 not significant at 0.05 level. The hypothesis, which states that there is no significant gender difference in the effect of blended learning approach on undergraduate students' academic performance, is accepted. Thus, there is no significant gender difference in the effect of blended learning approach on undergraduate students' academic performance. This means that the treatment was not gender sensitive. The treatment is applicable in the same way to male and female students.

Discussion of Findings

The findings of this study revealed a significant main effect of treatment (blended learning approach) on undergraduate students' academic performance, while the mean difference between the two groups was highly significant; and no significant gender difference in the effect of blended learning approach on undergraduate students' academic performance.

Studies have shown that students enjoy the blended learning experience (Akkoyunlu & Soylu, 2008; Banci & Soren, 2008) and that students in higher level academic work do not want to continue their education only in the traditional face-to-face learning environments nor do they want a purely online learning environment. They would like to meet and discuss the course content with their instructors and peers, but would like to use information technology as a learning tool as well (Orhan, 2008). All these studies stated above corroborate the result of this present study. The result of this present study is also in agreement with the finding of Hawkey and Beresford (2009) who found that blended-learning has a significant and positive impact on both teachers and students; and Shahin (2008), who found significant differences between the mean of the students' marks in the experimental group in the post-application for the trend's scale towards the blended learning in favor of the experimental group.

The significant effect of blended learning approach on students' academic performance found in this presented study might not be unconnected with the fact that the approach exposes the students to the use of information and communications technology (ICT). There is no doubt that this would affords the students various opportunities to combine their academic activities with family commitments without stress. This approach equally exposes students to various modern communication techniques, and bulk of online libraries and websites, which indeed promote students' learning and understanding.

The finding of this present study is also corroborated by Oblinger (2003) who in his study of generational values and education, concluded that based on the generational norms of Generation X (born between 1965 and 1980), blended learning offers a mechanism for meeting their needs within the value system that they embrace.

Milne (2007) also contended that this generation would not first associate cut and paste with scissors and glue and for them the digital camera always existed. As such, he argues that the learning space must be designed to accommodate the technological orientations of this generation. Davis and Fill (2007) equally buttressed this finding by concluding that blended learning has the potential to change students' experiences and outcomes through learning. Hameed, Badii, and Cullen (2008) in their study considered the efficiency of e-learning when mixed with traditional learning, also support the finding of this present study when they concluded that blended learning approach provides the most flexible method to e-learning.

Another likely reason for this study's finding might be due to several advantages of blended learning environments for learners. For instance, Azizan (2010) concluded that utilization of technology in physical classrooms offer extra resources for the students and this is expected to enhance learners' confidence and competence as well as improve the quality of learning. Chen and Jones (2007) also outlined other advantages of blended learning such as deep understanding of topics by using web-based resources as well as active participation of students in class.

Limitations

This study had some limitations. The sample of the study were students from only a level from four levels in the department used for the study. Also, a course out of all the courses in the department was used as it was the convenient sample due to time constraint. The experimental group students were engaged with the use of online materials, and learning content management system. All these will no doubt affect the generalizations of the findings.

Conclusion

Blended learning approach is the combination of face-to-face instruction with online platforms thereby provides conducive environment for both the traditional classrooms and the online settings. There is no doubt both face-to-face oral communication and online learning environment have different advantages which will be tapped with use of blended learning approach. For instance, the importance of facial expressions, eye contact, body language, and tone of voice on communication cannot be over-emphasized. Also the idea of integrating technology into course delivery allows students and teachers the use of information and communication technology for active learning. It should be noted that the use of this approach demands striking balance between face-to-face interaction and online access. It is therefore absolutely important that e-learning and face-to-face learning complement one another for purpose effective teaching and learning process. The use of blended learning is learners' centred thereby enables students plan their academic activities and learn at their own pace.

Recommendations

Based on the findings above, the following recommendations were proffered. Blended learning is suggested for teaching at university level for the purpose of helping the students to be thoughtful learners as the approach makes learning environment more conducive, customized and personalized.

The universities in the country should blend because blending learning helps in providing strategies to solve the challenges faced in teaching and learning activities. It is effective, inexpensive, and develops both students' and teachers' quest for technological advancement.

Finally, training on blended learning design and delivery should be regularly organized for the university dons so as to encourage professional development among faculty members.

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