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EFFECTS OF DEEP AND SURFACE LEARNING APPROACH ON THE ACADEMIC ACHIEVEMENT OF ECONOMICS EDUCATION UNDERGRADUATE STUDENTS IN KOGI STATE UNIVERSITY, AYINGBA

BY

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Abstract

The researchers examine the effect of deep and surface learning approach on the academic achievement of economics education undergraduate students in Kogi state university. Two research questions and hypothesis guided the study. The design of the study is the quasi-experimental research design which adopted the following procedures: pre-test, treatment, and post-test for non-equivalent intact classes. It is a quasi-experimental, non-randomized pre-test, post-test approach. Two research questions and two hypotheses guided the study. The population of the study consists of a total of 712 economics education students in Kogi State University. The sample consisted of 81(36 male and 45female) students who offer Economics education. Purposive and cluster sampling techniques were used to draw the sample for this study. A researcher developed achievement test titled, Economics Achievement Test (EAT). The (EAT) was used to elicit the academic achievement of students in Economics as a subject both at pre-test, and post-test, with a reliability co-efficient index of 0.87 obtained using Kudder-Richardson 20 statistic (K-R 20 Research questions will be answered using mean and standard deviation. Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The findings revealed that deep learning approach is slightly more effective when compared with surface learning approach in the improvement of Economics education students' achievement. The study recommended that the Ministries of Education should through seminars, workshops, and conferences equip Economics education educators with requisite knowledge, skills, and competences on the use of instructional strategies that will assist learners on deep and surface approach to learning for Economics education so as to promote effective teaching and learning towards a better academic achievement.

Keywords: Economics education, Gender, Deep learning approach, Surface learning approach and Academic Achievement

Introduction

The thrust of the entire education process is centered on teaching and learning. Teaching and learning form the basis for a lifelong education transformation of a child. It becomes more important when it is the tertiary education, since it is the education that transforms the students into an expert in their course area. Tertiary institutions are faced with the challenge of educating students to become life-long learners and versatile experts in their own fields. Fostering and stimulating the development of lifelong learning skills such as analytical and critical thinking has become a crucial goal for economics education students in higher education in the twenty-first century (Dolmans, et al., 2016). According to the Bologna declaration, successful learning and studying in higher education should involve students in deep learning (Asikainen 2014). In a recent literature review, Dinsmore and Alexander (2012) state that if research on students' learning is going to have any bearing on practice, one area in need of critical discussion is the investigation of deep and surface learning. From their review, Dinsmore and Alexander (2012) identified why the results of studies on deep and surface learning often result in ambiguous and inconsistent findings.

Students, irrespective of their gender, approach their learning in different ways, operating in response to a series of motivations, internal and external to themselves (Anum & Nwoga, 2022). Okeke (2018) gender describe the societal attributes given to a male or female but further argued that both male and female adopts a learning approach which may seem easier for them. The concept of deep and surface learning grew out of the research of Marton and Säljö in 1976. The terms describe the way students tackle their learning. Learners may use deep or surface strategies, or a combination of both throughout their studies. Course and assessment design and teaching methods all play an important role in fostering deep, surface and strategic learning. Deep learning in Delgado, et al (2018) posited that learners look at the significance of what they are being taught and attempt to make sense of it, connecting information and thinking into the topic. They look for the overall meaning and attempt to process information in a holistic way. Studies have shown that there a lot of factors responsible for students learning outcome there seen in their overall academic achievement. In this case, we focus on economics education student's academic achievement in school. The academic achievement of economics education students could be seen in the learning outcome that these students. This includes the knowledge, skills and ideas acquired and trained through the course of study within and outside the classroom situations (Akani, 2015).

Economics education student's academic achievement deals with the extent they have gained from a particular course of instruction, which focuses on the way and pattern the students approach the course (Anum & Eniwaiye, 2022). It also refers to

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cognitive score or learning outcome in economics education. Anum, and Ikedi, (2023) affirmed that economics education student's academic achievement is the scholastic standing of a student's performance at a given moment in terms of there over all cumulative grade point average. The purpose of testing an achievement is to help the teacher and the students evaluate and estimate the degree of success attained in learning a given concept. It is equally appropriate in determining the efficiency of instruction (Shaibu & Anum, 2022). Achievement test results enable the teacher to obtain information on the extent to which the students have attained a criterion achievement. It also enables us to determine the relative position or rank of individual students with respect to their achievement and to compare a student's achievement based on other student's achievement (Norm reference performance). Ebubechukwu, et al. (2021) stated that there are some factors that may determine student's level of academic achievement. These includes teachers centered factors, environment factors and leaners-centered factors (Ezeudu, 2013). Teacher-centered factor may include instructional methods, Technique, Strategies, etc.; environment factors may include classroom management and administration, classroom size, etc; while the leaners-centered factors learning styles, access and usage of learning materials, learning approaches. The learners develop their own interpretation of the content by integrating it with their existing knowledge. The learner's eithers take a deep approach or a surface approach to learning. Deep learning develops critical analysis and encourages long term retention of concepts. Deep learning is valued and fostered by educators.

With the deep learning approach, economics education students are "focused on understanding" (University of Oxford, 2017) and tend to engage in the more involved cognitive functions of analysis, evaluation and synthesis for in-depth acquisition of knowledge, thus enabling "higher quality learning outcomes" (Desierto, et al., 2018). Where deep learning strategies are adopted, there is transformation of knowledge and the student aims to comprehend content for their own development and interest; engages intensely with provided information and materials as well as relates what they are learning to prior "knowledge and experience" (University of Oxford, 2017). In addition, Wang (2013) suggests that "good teaching", "clear goals and standards", suitable "assessments", encouragement towards autonomous "learning" and quality feedback make it conducive for students to adopt deep learning strategies (Wang, 2013). A deep approach to learning is characterized by a personal commitment to learning and an interest in the subject. The student approaches learning with the intention to understand and seek meaning, and, consequently, searches for relationships among the material and interprets knowledge in light of previous knowledge structures and experiences. A deep approach to learning is more likely to result in better retention and transfer of knowledge and may lead to quality learning outcomes, such as a good understanding of the discipline and critical thinking skills. Deep learning to represent a learning strategy with critical thinking and reflective ability. Deep approach invokes learners' intrinsic intention to comprehend the meaning of learning tasks while surface approach induces learners' extrinsic intent toward the task itself (Li & Plunkett, 2022)

The deep approach comprises the capacity to correlate new and previous knowledge, study comprehensively in order to obtain the "entire picture" and search for meaning and implications for the acquired knowledge. Wang (2013) argued that deep strategy is based on personal commitment to the learning process and its motivation is intrinsic, in the search for self-fulfillment. This contrasts with the surface approach, which is the tendency to choose the quickest way to accomplish the task, in which students study the material in a linear manner, do not ask in-depth questions, do not show proper interest in the subject and rely on memory instead of comprehension. Students with surface approaches tend to achieve the minimum necessary to avoid failure at school. Surface approach learners focus upon details and parts of the information deemed important. Learning may be more superficial and not promote understanding. Learners may focus on unconnected facts that they believe they will need to reproduce later in an assessment such as an examination. Surface and deep approach express the two ways of learning styles. This contrasts with the surface approach, which is the tendency to choose the quickest way to accomplish the task, in which students study the material in a linear manner, do not ask in-depth questions, do not show proper interest in the subject and rely on memory instead of comprehension. Students with surface approaches tend to achieve the minimum necessary to avoid failure at school. (LeCun, et al., 2015). LeCun, et al., (2015). pointed out that a surface approach was conceptually based on the intention that is "extrinsic to the real purpose of the task", whose strategy arises from "'satisficing', instead of 'satisfying' task demands by investing minimal time and effort consistent with appearing to meet requirements". Biggs remarked on the common assumption that the presence of memory per se means the adoption of a surface approach is incorrect, which, according to him, "depending on context, may be part of a deep or an achieving approach" In discussing these approaches, researchers have argued that surface learning strategies are necessary for moving on to acquiring deeper knowledge (Ebubechukwu, et al., 2021) for certain fields of study and in specific contexts (Hattie & Donoghue, 2016), for developing deep learning capabilities (Hattie & Donoghue, 2016; Ebubechukwu, et al., 2021). For example, surface learning strategies, such as rote learning, are necessary for law students who must remember genuine elements of legal cases and court critical rulings to create compelling legal argumentation for use in a courtroom (Yin & Desierto, 2016). Surface strategies can also be used to develop and deepen understanding and can lead to more in-depth learning in languages, mathematics and the sciences (Ryan & Louie, 2007; Chan, 2004).

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As well as moving from surface to deep learning strategies, students can alternate between both learning approaches depending on their academic tasks or when struggling with their workloads (Wang, 2013). For example, the study by Brown and his colleagues found that the surface approach was predominantly used by 143 undergraduates of first-year chemistry when this subject was not their main interest (Brown, et al., 2015). A surface approach to learning is characterized by an intention to acquire only sufficient knowledge to complete the task or pass the subject. As such, the student relies on memorization and reproduction of material and does not seek further connections, meaning, or the implications of what is learned (Dolmans, et al., 2016). A surface approach is externally focused and tends to result in a lack of engagement with the subject, the accumulation of unrelated pieces of information for assessment purposes, and temporary learning outcomes (University of Oxford, 2017). Students are unlikely to experience high-quality learning outcomes, or develop appropriate skills and competencies, through a surface approach to learning. With the surface learning approach, economics education students are concerned with acquiring only sufficient knowledge to complete the task or pass the subject. The students depending on their individual ability to understanding, are more concerned in just passing exams and moving to the next class. This simply means the students in this category are concerned on their immediate class work. Without going through in-depth reading, they sometime memorize to excel. In surface learning, students focus on external goals such as getting a particular grade or award or pleasing or impressing someone else. These students tend to do only what is necessary and focus more on being able to regurgitate what they have learned rather than truly understanding and absorbing the material (Beattie, et al., 2010). Previous studies have pointed out that the same students can have varying approaches, depending on the subject that they are studying, levels of apprehension and work overload. Desierto, et al. (2018) Understanding these learning approaches could have important repercussions on students' academic life (Jensen, McDaniel, Woodard & Kummer, 2014). showed that students with a deep approach tend to be more organized, monitor their studies better and exert a greater effort to learn, such that their performance in tests is better. The same results were found by Brown, et al, (2015) who found that students with a deep approach had better outcomes in final exams.

For educators to understand the learner, they need to consider the latter's innate cognitive processes of learning, the experience and background that they bring to the learning process, the quality of the teaching process they undergo as well as the larger educational and social environment within which the learning takes place. Over the years, the achievements of students in Economics education in Kogi State University Ayingba depict poor achievement of students in Economics education. This, in addition to research findings, could be attributed to students learning approach. Of all the causes of under achievement of students in Economics education, learning approach has continued to receive a major condemnation. This could be because of its ineffectiveness in arousing the students learning approach, thus leading to constant underachievement and negative learning approach by the students. The need to redress this alarming academic problem among the students irrespective of their gender necessitated exploring the learning approach that could improve students' academic achievement towards Economics education.

The main purpose of this study was to examine the effect of deep and surface learning approach on the academic achievement of economics education undergraduate students in kogi state university. Specifically, the study ascertained the:

1. most effective learning approach (deep learning and surface learning) on Economics education students' achievement in as measured by their mean scores in the pre-test and post-test,
2. effects of deep learning approach and surface learning approach on male and female Economics education students' achievement as measured by their mean scores in the post-test only,

Research Questions

The following research questions were posed by the researcher in line with the purpose of the study

RQ_1: Which of the two learning approaches (Deep and Surface) is the most effective on students' achievement in Economics Education as measured by their mean scores in the pre-test and post-test?

RQ_2: What are the mean achievement scores of male and female Economics education students using deep learning approach and surface learning approach in the post-test only?

Hypotheses

These hypotheses are formulated and tested at 5% error level.

Ho_1: The mean achievement scores of Economics education using deep learning approach and surface learning approach in the pre-test and post-test are not significantly different

Ho_2: The mean achievement scores of male and female Economics education students using deep learning approach and surface learning approach in the post test only are not significantly different.

Methodology

The design of the study is the quasi-experimental research design which adopted the following procedures: pre-test, treatment, and post-test for non-equivalent intact classes. It is a quasi-experimental, non-randomized pre-test, post-test approach. Two research questions and two hypotheses guided the study. The population of the study consists of a total of 712 economics

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education students in Kogi State University. The sample consisted of 81(36 male and 45female) students who offer Economics education. Purposive and cluster sampling techniques were used to draw the sample for this study. A researcher developed achievement test titled, Economics Achievement Test (EAT). The (EAT) was used to elicit the academic achievement of students in Economics as a subject both at pre-test, and post-test. The initial draft copies of the instrument were given to five specialists, three in economics education and two from measurement and evaluation. The content of the instrument was validated by experts in education measurement and evaluation and economics with a reliability co-efficient index of 0.87 obtained using Kuder-Richardson 20 statistic (K-R 20). This was considered adequate for the study. Research questions will be answered using mean and standard deviation. Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The hypotheses decision rule was based on the calculated F-cal against the tabulated F-tab. In this case, if the F-calculated is greater than the F-tabulated, the hypothesis was rejected but if otherwise, it was accepted. But in the case of using SPSS, the rejection of the hypotheses was based on the comparison of the SPSS p-value or significance level in the output directly with the chosen 0.05 alpha level of significance. When the p-value is equal to or less than the chosen alpha, reject the null hypothesis, if otherwise, accept the null hypothesis.

Results

RQ_1: Which of the two learning approach (Deep and Surface) is the most effective on students' achievement in Economics Education as measured by their mean scores in the pre-test and post-test?

Table 1: Descriptive statistics for the mean achievement scores of students taught Economics Education using Deep and Surface learning approach in the pre-test and post test

Mean ($\bar{X}$), Standard Deviation (S) and Sample Size (n)

Descriptive Statistics			
Pre Test			
Teaching Methods	**Mean ($\bar{X}$)**	**Std. Deviation (S)**	**Sample (n)**
Deep Approach	18.00	2.036	42
Surface Approach	18.82	1.862	39
Post Test			
	Mean ($\bar{X}$)	**Std. Deviation (S)**	**Sample (n)**
Deep Approach	33.12	2.725	42
Surface Approach	32.69	2.028	39

Table 1, presents the result of data concerning research question 2 for the mean achievement scores of Economics education students using deep learning approach and surface learning approach in the pre-test and post-test. The result shows that Economics education students who adopted deep learning approach had pre-test achievement mean score of 18.00 and post-test mean score of 33.12. While those with surface learning approach had pre-test achievement mean score of 18.82 and post-test mean score of 32.69. Looking at the standard deviations, it was seen that the distance between the standard deviation and the mean scores of the groups shows that there is homogeneity of scores in the distribution. The gap in the mean scores of the two groups at post-test indicates that deep learning approach is slightly more effective when compared with surface learning approach in the improvement of Economics education students' achievement.

Hypothesis 1

Ho_1: The mean achievement scores of Economics education using deep learning approach and surface learning approach in the pre-test and post-test are not significantly different.

Table 2: Inferential statistics for the significant difference between the mean achievement scores of Economics education using deep learning approach and surface learning approach in the pre-test and post test

Tests of Between-Subjects Effects					
Dependent Variable: Post-Test					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.732[a]	2	1.866	.316	.730
Intercept	939.918	1	939.918	159.148	.000
Pre_Test	.049	1	.049	.008	.928
Learning Approach	3.698	1	3.698	**.626**	**.431**
Error	460.663	78	5.906		
Total	88212.000	81			
Corrected Total	464.395	80			
a. R Squared = .008 (Adjusted R Squared = -.017)					

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Table 2, presents the result of data concerning hypothesis 2 for the significant difference between the mean achievement scores of Economics education using deep learning approach and surface learning approach in the pre-test and post-test. It was indicated in the table that the F-calculated (F-cal) value is low at 0.626. The p-value of 0.431 is greater than 0.05 level of significance, leading to the acceptance of the null hypothesis indicating that mean achievement scores of Economics education students using deep learning approach and surface learning approach in the pre-test and post-test are not significantly different.

Research Question 2

RQ_2: What are the mean achievement scores of male and female Economics education students using deep learning approach and surface learning approach in the post test only?

Table 3: Descriptive statistics for the achievement scores of male and female Economics education students using deep learning approach and surface learning approach in the post test only

Mean ($\bar{X}$), Standard Deviation (S) and Sample Size (n)

Descriptive Statistics				
Post Test				
Deep learning	**Gender**	**Mean ($\bar{X}$)**	**Std. Deviation (S)**	**Sample (n)**
	Male	33.41	3.537	17
	Female	32.92	2.060	25
Surface learning	**Gender**	**Mean ($\bar{X}$)**	**Std. Deviation (S)**	**Sample (n)**
	Male	32.95	2.172	19
	Female	32.45	1.905	20

Table 3, presents the result of data concerning research question 3 for the mean achievement scores of male and female Economics education students using deep learning approach and surface learning approach in the post test only. The result presented showed that male economics education students with deep learning approach had a post-test mean achievement score of 33.41 while the female students had post-test mean achievement score of 32.92. On the other hand, male economics education students with surface learning approach had a post-test mean achievement score of 32.95 while the female students had post-test mean achievement score of 32.45. The standard deviations of the groups at post-test indicate that there is homogeneity of the scores in the learning approach. This result indicated that Economics education students using deep learning approach and surface learning approach did not discriminate across the achievement of male students and the female students. This implies that deep and surface learning approach are effective on the male and female students alike.

Hypothesis 2

Ho_2: The mean achievement scores of male and female Economics education students using deep learning approach and surface learning approach in the post test only are not significantly different.

Table 4: Inferential statistics for the significant difference between the mean achievement scores of male and female Economics education students using deep learning approach and surface learning approach in the post test only

Tests of Between-Subjects Effects					
Dependent Variable: Post Test					
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	4.151[a]	2	2.076	.352	.705
Intercept	996.715	1	996.715	168.919	.000
Pre-Test	.001	1	.001	.000	.993
Gender	4.118	1	4.118	**.698**	**.406**
Error	460.244	78	5.901		
Total	88212.000	81			
Corrected Total	464.395	80			
a. R Squared = .009 (Adjusted R Squared = -.016)					

Table 4, presents the result of data concerning hypothesis for the significant difference between the mean achievement scores of male and female Economics education students using deep learning approach and surface learning approach in the post test only. The result shows that the F-calculated (F-cal) value is 0.698. The p-value of 0.406 is greater than 0.05 level of significance. This led to the acceptance of the null hypothesis indicating that mean achievement scores of male and female Economics education students using deep learning approach and surface learning approach in the post test only do not differ significantly.

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Discussion of Findings

It was revealed in this study that deep learning approach is slightly more effective when compared with surface learning approach in the improvement of Economics education students' achievement. That is to say that those students in deep learning approach achieved better than those surface learning approach students. This finding is true because, deep learning approach leverages focused on understanding" and tend to engage in the more involved cognitive functions of analysis, evaluation and synthesis for in-depth acquisition of knowledge, thus enabling "higher quality learning outcomes. On the side of surface learning approach, has the tendency to choose the quickest way to accomplish the task, in which students study the material in a linear manner, do not ask in-depth questions, do not show proper interest in the subject and rely on memory instead of comprehension. In agreement with this finding, Desierto, et al, (2018) found that the results of this small-scale study on the learning strategies used by enabling students appear to both support and contradict existing literature on deep and surface learning approaches to learning. Similarly, University of Oxford, (2017) revealed that there were statistically significant differences between the experimental and the control groups, in favor of the experimental group using of blended learning. Similarly, Dolmans, et al, (2016) showed positive tendency for the effects of problem-based learning on deep learning with eleven studies of the 21 yielding a positive effect (i.e., a higher score or increase in the learning approach which we will label in the remaining of the text as 'increase') compared to four studies yielding a negative effect (i.e., a lower score or decrease in the learning approach which we will label in the remaining of the text as 'decrease').

It was also found in this study that male and female students' achievement in Economics education when both groups learnt using deep and surface learning approach did not differ significantly. This indicates that deep and surface learning approach are effective on both genders. This finding does not confirm the speculation that males tend to perform better in some subjects than the females. Hence, gender does not make any difference in students' achievement as far as learning Economics education was concerned using deep and surface learning. This finding is in consonance with Ebubechukwu, et al (2021) study which revealed that gender has no effect on the students' academic achievement when exposed to the same number of activities (deep learning and surface approach). In a related manner, Also, Okeke (2018) revealed that gender is not a significant factor on the effect of learning technique on secondary school slow learners' acquisition of keyboarding skills in Anambra state. The similarities recorded above could be linked to similar nature of subjects of other studies and that of the present study.

Conclusion

The type of learning approach used (surface or deep) is associated with study patterns, preference for type of assessments, among economics education students. Educators need to be attentive to the type of learning that their students use and need to think about measures that will have a positive impact on the interactivity between teaching methods and assessments, and on students' quality of learning.

Recommendations

1. The Ministries of Education should through seminars, workshops, and conferences equip Economics education educators with requisite knowledge, skills, and competences on the use of instructional strategies that will assist learners on deep and surface approach to learning for Economics education so as to promote effective teaching and learning towards a better academic achievement.
2. Teacher training institutions like Universities' Faculties of Education and Colleges of Education should include strategies among the modern participatory instructional strategies in teacher preparation in order to promote students with deep and surface learning approach of Economics education towards enhanced students' academic achievement in the course.

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