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Influence of Threshold Concept and Flipped Classroom on Senior Secondary School Students' Academic Achievement in Economics in Lagos State, Nigeria

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Abstract

This study examined the influence of threshold concepts and flipped classroom on academic achievement in Economics among senior secondary school students in Lagos State, Education District V in Nigeria. Survey research method was employed using questionnaires and achievement test as the instruments to elicit data from the respondents. The data was analysed using quantitative research methods such as frequency, percentage, mean, standard deviation and Multiple Regression analysis. The findings showed that there is a significant joint influence of threshold concept and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V ($F_{3, 371} = 3.059$; $P<0.05$). Also, threshold concept in Economics ($\propto = 0.166$; $t = 2.514$; Significance $= 0.012$) and active learning in flipped classroom ($\propto = 0.222$; $t = 3.471$; Significance $= 0.003$) are relatively significant at $P<0.05$ with flipped classroom being a stronger predictor. Based on this findings therefore, it was recommended that teachers, schools, ministries of education and NERDC should all work together to find the synergy between threshold concept and flipped classroom as framework for the improvement of academic achievement in Economics in senior secondary schools in Lagos State, Nigeria.

Keywords: Academic Achievement, Economics, Flipped Classroom, Threshold Concept, Student.

Word Count: 197

Introduction

As the importance of Economics to the country has grown over time, promoting it as a subject in the curriculum of senior secondary schools and as a course and higher institutions, is fundamentally necessary. Economics focuses on human behaviour under the presumption that people act rationally and seek the greatest amount of utility or benefit. Education in Economics aims to produce responsible citizens and capable decision-makers (Mohammed & Pitan, 2022). The senior secondary school curriculum in Nigeria includes it as a humanities topic. Nigerian languages, English-language literature, geography, politics, Christian religious studies, Islamic studies, history, visual arts, music, French, and Arabic are additional topics in this area (NERDC, 2022). Economics is the foundational topic for any aspiring higher education students in Nigeria who seek to pursue social science, management science, and commercial degrees, as it is a requirement for entry into their desired programs and institutions and must be passed at the credit level (Adio, Oluwatosin, & Olatunde, 2021).

One of the factors that affects a school's reputation is the quality of its Economics students. The task is to continually enhance the curricula so that students' learning and the growth of their skills, which are as a result of resourceful classroom interaction between teachers and learners, distinguish them. The intricate process of learning evaluation, which aims to gain knowledge about what the students learn, what the teacher teaches, and the implemented percentage of the curriculum, is currently an integral part of the crucial educational process, which calls for the teacher to have comprehensive mastery, skill assessments, and a complete cognizance of the main goals of the curriculum. Additionally, it is a component of the teaching process; reflection, choice-making, value judgment regarding accomplishments, changing the idea of evaluation as a prerequisite for approval and promotion, putting emphasis on the evaluation of academic achievement as a top priority, and understanding how much and how students have learned to advance their academic achievement in Economics (Adio *et al.*, 2021; Edu, 2012).

Academic achievement in Economics (particularly in the West African Senior Secondary School Certificate Examination (WASSCE),

has been dwindling in the last two decades, which is often a fall out of the fact that, most students often find themselves in a state of confusion, giving answers that lack authenticity, rather than writing the correct use of concepts and terminologies that would earn them full marks. Supporting this is the findings which averred that the percentage of senior secondary school leavers that are not eligible for admission into tertiary institutions each year due to failing grades in Economics on the senior secondary school certificate is very high (Adio *et al*., 2021). This assertion was also buttressed in a number of WAEC chief examiners' report, where it was pointed out among others, that there is a drop in students' achievement in Economics when compared to previous years in Nigeria. Similarly, many candidates struggled to articulate their views when attempting to respond to questions by using the proper economic terminology, which led to poor academic achievement in Economics for those years despite its important to human lives (Chief Examiner's Report, 2018, 2015, 2019). As a result of its comparative value to human lives, it is expected that every student will view Economics as precise, interesting, simple, and important to practical aspects of life. Ironically, it appears that this isn't the case since many students consider economics to be a difficult, abstract, and nearly impossible subject to excel in. This perceived difficulty may emerge from various difficult topics that are inherent in economics, some of which are threshold concepts and act as openings or doorways to mastering the subject (Edu, 2012).

Every subject has threshold concepts, which are ideas or learning opportunities that might be compared to opening a doorway to mastery of the subject. These ideas bring a new viewpoint on the subject and enable the perception of things that were previously inaccessible. A threshold concept is the key thematic shift in cognition that a learner must make in order to see the world from the viewpoint of a particular subject. The student's viewpoint must cross a certain threshold before it changes. When students cross the threshold from their old ways of thinking into a new one that is necessary, this state of mind is known as the liminal space and it involves a change in the learner's worldview or phenomenology (Davies, 2012; Martin Shanahan & Shanahan, 2016; Meyer, Land, &

Baillie, 2019). It would also be extremely essential to have a threshold concept that would help students of Economics "make sense" of many previously unconnected concepts and incorporate them into the subject. It would also help them communicate Economics-specific terms more effectively (Land, Meyer, & Flanagan, 2016; Meyer *et al.,* 2019).

The notion of a threshold concept accentuates the influence that studying a specific concept would have on students and the transformation in understanding that would ensue from such learning. It has value for teachers in two ways: It involves a notion, whose adoption is seen as being fundamental to exemplify comprehension, and gives teachers information about whether a student genuinely understands the discipline's fundamental concepts. It throws opens new perspectives for the student to observe the world, which increases its potential relevance. The research on threshold concepts puts the spotlight on the difficulties that students encounter while attempting an establishment of frameworks of discipline in their cognition. “Aforementioned changes express threshold concepts' prime concern on higher education learning research and last years of secondary schools” (Davies, 2019).

Speaking of the senior year of secondary school, numerous academics have looked into first-year college students' knowledge of important economic concepts. Identifying threshold concepts, characteristics of threshold concepts, and the influence they have on Instructional processes in Economics in higher education have received more attention than anything else. The latter two years of senior secondary school appear to receive almost no attention, despite the fact that they constitute the prerequisite for learning the subject. A spillover of what students acquired in their secondary schools is the disposition that students demonstrated in any subject at the higher institution, from memorisation to possessing a thorough grasp. The success of students' academic achievement therefore depends on research into the conceptual frameworks that underpin the study of economics and how they are taught in secondary schools (Yahya, Edu, & Etoh, 2019).

The continuance of these weaknesses in students' academic performance and their grasp of Economics in exams necessitates a

reconstruction of knowledge through interaction between knowledge components and modes of instruction. To study its effects on students' understanding of the subject-specific terminology and to inform improved academic achievement in Economics examinations, it is necessary to teach Economics using a threshold concept-informed curriculum.

An accompanying active learning in a flipped classroom, which is widely accepted for students understanding, must be incorporated in teaching. Finding the linkages between the framework theory of threshold concept and the flipped classroom in the field of Economics will help find an appropriate theoretical foundation for curriculum reform and renewal (Mohammed & Pitan, 2022; Olaniyi, 2020).

In a flipped classroom, students watch lectures online outside of class rather than sitting through an entire period of lecture time, and then complete activities through active learning in class. It is described as a "pedagogical strategy in which students, with the help of their peers and teachers, synthesize lessons learned during instructional processes and gain new knowledge through concise videos, podcasts, and e-books and also the online world beyond the class" (Deng, 2019; Mohammed & Pitan, 2022). Quizzes, individual exercises, pair group exercises, and resource persons are just a few examples of the many active learning methods that the flipped classroom incorporates into instruction (Olaniyi, 2020). During flipped classroom, the contact and substantial pedagogical exploits that take place in the course of the face-to-face time are the most significant aspects the classroom learning. This technique of instruction is carried out in such a way that it puts the topic under consideration to the forefront so that the economics students can actively participate in the instructional process and shift from naïve to approach issues economically, thus, rather than passively receiving the fundamental knowledge in class, students can hash through the unanswered and challenging questions with their peers or lecturers (Mohammed & Pitan, 2022). This is in direct conformity with the transformative nature of threshold concepts, and it also explains why a curriculum informed by threshold concepts and the flipped classroom technique are the greatest matches for teaching economics.

The adoption of flipped classroom and the introduction of threshold concept as a theory to reinvigorate the curriculum for senior secondary school students studying economics could mean the difference between success and failure in their WASSCE as well as when they eventually enlist as undergraduates in economics or a related field. Pursuant to this, the researchers decided to examine the individual and combined effects of the threshold concept and the use of the flipped classroom on senior secondary school students' academic achievement in Economics in Lagos State, Nigeria. Discussion and recommendations of this study would also be presented in order to reduce the rate at which secondary school students display phobia for Economics and thereby upscaling academic achievement in Economics.

Statement of the Problem

The degree of academic achievement of students in WASSCE is often the key education indicator that stakeholders are interested in. In order to demonstrate their understanding of the subject matter in their examination responses, economics students are expected to use a set of specific concepts. However, most students frequently have a common misconception and often write answers that lack authenticity rather than using the correct concepts and terminology that would earn them full marks. The WAEC Chief Examiners' report noted, among other things, that there has been a decline in students' economics achievement compared to previous years. Also, that a good number of candidates failed to use the correct economic terminologies in providing answers to the questions they attempted, thereby making it difficult to put forward their points (Chief Examiner's Report, 2018 & 2019). In an effort to give a remedy for these academic frailties in economics as a subject, teachers and lecturers are frequently subjected to series of seminars, workshops and conferences on the best teaching methods, teaching aids, and attitudes toward the subject and students. These, however, doesn't seem to be sufficient, since students continue to grapple with their understanding of the terminology specific to economics and repeat the same errors year after year for a variety of reasons. Meanwhile, the topics included in the Economics are meant to prepare students who

chose to study Economics for prosperity in the current economy. Poor understanding of Economics is capable of having negative effects on students' academic achievement as well as their ability to address the microeconomic and macroeconomic problems facing a developing country like Nigeria. Thus, it becomes vital to promote a conceptual difference in the way economics is taught and learned by reframing the curriculum through the lenses of threshold concepts and flipped classroom. The thrust of this study therefore is to identify the threshold concepts inherent in the Economics and examine their effects if deployed in classroom teaching to demystify the difficulties and abstractions in Economics learning to the students.

Aim and Objectives of the Study

The aim of this study is to investigate the effect of threshold concepts and flipped classroom on academic achievement in Economics among senior secondary school students in Lagos State, Nigeria. Specifically, the objectives of this study sought to;

1. examine the joint influence of threshold concepts and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V.
2. assess the relative influence of threshold concepts and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V.

Hypotheses

In this study the researcher hypothesised that:

H_o1: There is no significant joint influence of threshold concept and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V.

H_o2: There is no significant relative influence of threshold concept and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V.

Threshold Concepts and Students' Academic Achievement

The Threshold Concept offers a framework of features for highlighting relevant conceptual thinking that serves as learning gates within a subject area or field. These learning portals are regarded as a threshold that must be passed by students in order to increase their mastery of their educational experiences and to view a certain aspect of the universe in a completely fresh, transforming, and frequently unexpected way. Following such changed comprehension, further professional and in-depth learning related to the notion is made feasible, which results in an improvement in academic achievement in the subject area under consideration. In fact, without a threshold concept—which "indicates a new way of perceiving, comprehending, or interpreting something, without which the learner cannot advance"—such heights of academic achievement could not be feasible. However, students will advance to higher levels of comprehension at varying rates and through various learning strategies (i. e. active learning in a flipped classroom) (Tucker, Weedman, Bruce, & Edwards, 2014).

According to some notable academicians (Land & Meyer, 2006; Shanahan *et al.,* 2006; Tucker *et al.*, 2014; Martin Shanahan & Shanahan, 2016; Timmermans & Meyer, 2019), the degree of exposure to threshold concepts distinguishes students who have mastered the pedagogy of a subject from those who have only a cursory understanding of it.

Integrative threshold concept knowledge translates along with "threshold concept representations" and is a "socio-empirically created learning" with the main goal of improving academic achievement. Also prominent among its aim is to suggest a framework that is informed by research and supported by empirical data to assist university academics in creating and integrating Integrative Threshold Concept Knowledge. This paradigm relied from a wealth of research literature that incorporated knowledge from various academic fields, nations, and institutional contexts. There are seven principles underlying this which are expounded below (Timmermans & Meyer, 2019).

a. As a first principle of the framework, effective teaching prioritises advancing student learning. The aforementioned goal is perfectly linked with a focus on building this foundation. This methodology

promotes adopting a learning-centered rather than a teaching-centered methodology.

b. The focus should always be on transformative learning in any conversation about learning threshold concepts. This suggests that adjustments will be made at the epistemological, ontological, as well as cognitive levels, or in terms of how people think, act, and "be".
c. Two essential components of learning are emotion and motivation. It's possible to feel "upset" after learning transformative threshold concepts on many different levels. Although there is intellectual dissonance, it is also important to consider the epistemological and ontological unshackling it may bring about as learners are presented with the opportunity to alter their identities and worldviews. (sometimes welcome, sometimes not). The emotional reactions to and motivational inclinations toward these events may vary among learners. Therefore, working with threshold concepts gives you the chance to have insightful conversations about emotion and motivation as essential components of learning.
d. Additionally supporting the framework is the cultivation of care. Teachers who are performing this (perhaps) revolutionary activity are cared for by developers, who also cultivate this care. They might also inspire teachers to consider the ways in which they demonstrate concern for the discipline, for the students, and for the way in which the students are learning the disciplinary Threshold Concept.
e. The framework's suggested activities also promote “celebrating rather than suppressing differences” as individual students undergo transformative learning. The activities encouraged by the framework are based on the underlying presumption that learners will experience the unpredictable transformative (liminal) environment in numerous dimensions.
f. The paradigm is also based on the notion that practitioners of reflective practice will apply and encourage it in educational settings. As participant instructors' experiences and answers develop, developers can modify the framework on the spot. Developers can simultaneously challenge teachers to consider how

much of the framework applies to their particular situational needs and to interact with the framework from the viewpoints of their students.

g. The last principle is that educational developers should have a part in fostering communication. By urging educators to share new insights as they progress through the framework with colleagues, solicit input from them, and incorporate these insights into their work, they may support knowledge sharing within traditional academic communities.

Flipped Classroom and Students' Academic Achievement

The following two factors explain why the flipped classroom received so much popularity and rose to prominence in some regions of the world: (1) The Flipped Classroom is ensured by cutting-edge technology, and after class, students are able to watch self-directed learning clips. (2) A lot of schools use videos to be watched online or offline. The Flipped Classroom has recently gained popularity in American classrooms. The Flipped Classroom in America concentrates on science disciplines including math, physics, and science and centers on elementary and high schools. The educational process encourages scholars' and teachers' acceptance of the flipped classroom. According to their approach to teaching, they enumerated the benefits and drawbacks of the flipped classroom (Deng, 2019).

Many researchers (Sams & Bergmann, 2013; Deng, 2019; Olaniyi, 2020) have the conviction that the Flipped Classroom could have more positive benefits than the Traditional Classroom. The majority of their studies showed that students absorb the training video at their own pace and would access the internet and social media to find the information they need. When students complete "homework" in class, teachers have additional opportunity to provide students feedback and gain a better understanding of their learning preferences and challenges. The time spent in the classroom can therefore be utilized more effectively and creatively as a consequence. It turns out that as student achievement rises, interest and involvement do as well. Additionally, viewing and learning from one another's videos helps teachers' professional development (Deng, 2019).

Because teachers need more time to develop the courses, flipping the classroom places a greater demand on their ability to engage in teaching design activities. Students are made the focal point of the lessons, and they are expected to set their own schedules and take responsibility for themselves (Sams & Bergmann, 2013). Compared to a traditional classroom, A flipped classroom benefits students' ability to learn, be motivated, and ability to get top rankings. The flipped classroom encourages greater interaction and communication between teachers and students while also encouraging greater participation from the students.

Even though the Flipped Classroom has many benefits, many scholars and teachers have reservations about the method of instruction. According to some authors, there are numerous disadvantages in practice, including the possibility that students will completely skip the materials, a difference in the quality of the teaching videos due to the skill of the creators, a small chance that students will benefit fully from the teaching videos, and a lack of use of the in-person classes 39, 40 & 41 (Goodwin & Miller, 2013; Milman, 2012; Nielsen, 2012).

The design of teaching materials and instructional activities determines whether or not the impacts of teaching can be improved. However, other authors emphasise how crucial teachers are to the flipped classroom. According to more academics, augmenting traditional teaching techniques with technology while flipping the teaching schedule does not fundamentally alter learning in any way (Berrett, 2012; Deng, 2019).

Methodology

In this study, the descriptive research design was used. The participants were all senior secondary school students who offer Economics and their Economics teachers in humanities department in the 69 public senior secondary schools in Lagos State Education District V.

The sample size for this study for students was obtained by applying the scientific formula provided by Taro Yamane,

$$\text{Sample size (n)} = \frac{N}{1+N(e)^2}$$

e = error of sampling (***5%*** or ***0.05***),

Where ***n*** = sample size,

1 = constant

N = Economics Students' population (57,136)

Economics Teachers' population (139)

$$\text{Economics Students' sample size} = \frac{57{,}136}{1+57{,}136(0.05)^2} = 397.21 \approx 397$$

$$\text{Economics Teachers' sample size} = = \frac{139}{1+139(0.05)^2} = 103.15 \approx 103$$

$$\text{Total sample size} = 397 + 103 = 500$$

The sample size calculations give a value of 500 for both Economics students (397) and teachers (103). A multi stage sampling technique was used to select teachers and students offering Economics in the sampled schools, in Lagos State Education District V. At the first stage, systematic sampling technique was used to select ten (10) schools from each of the four (4) local governments (Ajeromi Ifelodun, Amuwo Odofin, Badagry and Ojo) in Lagos State Education District V, making a total of 40 schools. At the second stage, purposive sampling technique was used to select 103 teachers from the selected schools. At the third stage simple random sampling technique was used to select 397 students from the sampled schools. The research instruments are threefold, teachers' questionnaire tagged Threshold Concept, Flipped Classroom and Academic Achievement in Economics Questionnaire (TFAEQ) (0.69), students' questionnaire tagged Active Learning, Teachers Attitude towards Economics and Students' Academic Achievements (ALTASA) (0.72) and students' academic achievement test (0.53). The data collected were analysed using quantitative research methods such as frequency, percentage, mean, standard deviation, and multiple regression. All data collected was analysed through Statistical Package for Social Sciences version 23.

Findings and Discussion

The results of the findings are outlined below;

Test of Hypotheses

H_o1 There is no significant joint influence of threshold concept and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education, District V.

Table 1: Summary of the Model and Multiple Regression Analysis Coefficients for the joint influence of threshold concept and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V.

ANOVA							Model Summary			
Model		Sum of Squares	df	Mean Square	F	Sig.	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	Regression	31.295	3	2.529	3.059	0.008	0.977	0.956	0.950	0.01412
	Residual	2269.873	371	1.893						
	Total	2301.168	374							
Dependent Variable: Students' academic achievement in Economics										
Predictors: (Constant), active learning in flipped classroom, threshold concept										

Source: Field work, 2022

F-value is significant at P<0.05

Table 1 shows that there is a significant joint influence of threshold concept and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V ($F_{3, 371} = 3.059$; $P<0.05$). This clearly indicate that the model represents a good fit of the data. Therefore, the null hypothesis is rejected. This mean that there is a significant joint influence of threshold concept and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V ($F_{3, 371} = 3.059$; $P<0.05$). This result is quite similar to the research work on "Impact of Flipped Classroom on Mathematics Learning Outcome of Senior Secondary School Students in Lagos, Nigeria" which noted that active learning such as quizzes in a flipped classroom and mastery of difficult topics or concepts in Mathematics significantly

influence mathematics learning outcome and their achievement in the subject in Lagos state (Makinde, 2020). Another study also showed significant effect of flipped teaching and learning method involving threshold concepts on students' academic achievement in social studies in Imo State, Nigeria (Ipem, Onyemanche, & Onwudiwe, 2021).

$H_0$2: There is no significant relative influence of threshold concept and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V.

Table 2: Multiple Regression Analysis Coefficients for the relative influence of threshold concept and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V.

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	35.774	1.687		12.152	0.000	27.124	34.432
	Threshold concepts	0.097	0.039	0.166	2.514	0.012	0.065	0.296
	Active learning in Flipped classroom	0.101	0.022	0.222	3.471	0.003	0.054	0.143

Dependent Variable: Students' academic achievement in Economics

Source: Fieldwork, 2022

Beta Coefficients significant* at *0.05 (P<0.05)

Table 2 shows the coefficients of multiple regression analysis for the relative influence of threshold concept and the active learning in flipped classroom on academic achievement in Economics among Senior Secondary School Students in Lagos State Education District V. The table shows that the beta coefficient (β) and t- values for mastery of threshold concept (opportunity cost, demand and supply, and price determination) in Economics (Beta = 0.166; t = 2.514; Significance = 0.012) and active learning in flipped classroom (Beta = 0.222; t =

3.471; Significance = 0.003) are relatively significant at $P<0.05$. Furthermore, the B-coefficient value indicates the average increase in students' academic achievement in Economics associated with a unit increase in the predictors. This result is quite similar to the research work on "Impact of Flipped Classroom on Mathematics Learning Outcome of Senior Secondary School Students in Lagos, Nigeria" which noted that active learning in a flipped classroom and mastery of difficult topics or concepts in Mathematics have relative significant effect on mathematics learning outcome and their achievement in the subject in Lagos state (Makinde, 2020). Another study also showed that flipped teaching and learning method involving threshold concepts have individual prediction on students' academic achievement in Social Studies in Imo State, Nigeria (Ipem *et al*., 2021).

Conclusion

This study was carried out to investigate the effect of threshold concepts and flipped classroom on academic achievement in Economics among senior secondary school students in Lagos State, Nigeria. The findings reveal a significant joint influence of threshold concept and the active learning in flipped classroom on students' academic achievement in Economics. It also showed that threshold concept and active learning in flipped classroom both have relative significant influence on students' academic achievement in Economics.

Recommendations

On the basis of the findings, it can therefore be recommended that:

1. All efforts should be made by the Lagos State Government and other educational stakeholders towards improving the academic achievement of the students in Economics;
2. Teachers should ensure that they focus extensively on ensuring that their students thoroughly master threshold concepts in Economics as they could play in major role in determining their academic achievement;
3. Teachers should also try as much as possible to utilize active learning such as quizzes, individual exercises, group work/pair activity and resource persons in a flipped classroom regularly so as

to stimulate the creativity and mental abilities of the students in Economics; and

4. Government, teachers, schools, ministries of education and NERDC are all charged to all work together to find the synergy between threshold concept and flipped classroom as framework for the improvement of academic achievement in Economics in senior secondary schools in Lagos State, and by extension, Nigeria.

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