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Effect of Flipped Classroom on Learning Management Systems and Face-to-Face Learning Environments on Students' Gender, Interest and Achievement in Accounting

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Effect of Flipped Classroom on Learning Management Systems and Face-to-Face Learning Environments on Students' Gender, Interest and Achievement in Accounting

Keywords: Flipped classroom, Learning-Management-Systems, Face-to-face learning environments, Students' achievement, Accounting, and interest.

1. Introduction

The rate of failure in accounting courses in tertiary institutions in Nigeria and other parts of the world as reported by previous researches is a clear proof that learning of accounting generally is a difficult task particularly to newly admitted students of accounting education programs. The failure rate especially, in financial accounting courses is as high as 43.41 percent (Rissi & Marcondes, 2011). This figure has a detrimental effect on manpower development in accounting because students' decisions about majoring in accounting are often influenced by their level of performance (success or failure) particularly in the introductory accounting courses. Research has shown that several factors are responsible for poor academic performance of the students in introductory accounting in tertiary institutions. Some of the factors frequently noted include lecturers' attitudes to instructional planning, poor instructional delivery, inappropriate selection of instructional resources, and poor instructional evaluation (Akenbor, 2014). Other factors contributing to students' poor performance in accounting include: teaching methods (Wooten, 1998), neglect and lack of adequate concern about technological change and its effect in today's world of work by the accounting lecturers, students poor background in accounting, students lack of interest and assumptions that the course requires a lot of calculations and that it is very difficult (Parnham, 2001).

Several authors have conducted researches on the causes of students' failure in introductory accounting courses and have classified the causes into two, namely: internal factors (Basile & D'Aquila, 2002; Principle, 2005), and external factors (Booker, 1991; Gist, Goedde, & Ward, 1996; Eze, 2014). Internal factors include course schedule, classroom environment, class size, accounting concepts that has business reality scenarios and exams, while external factors include: extracurricular activities, family activities, and a combination of those factors (Wooten, 1998; Principle, 2005). Principle (2005) also pointed out that factors such as students' lack of study, inability to apply contents, motivation, i.e. students' self-expectations and their perception about

learning environment could also influence their efforts to learn and affect their achievement in introductory accounting. These studies provide converging proof that prior accounting experience and good instructional process have direct effect on students' academic achievement in introductory accounting courses.

Achievement as the art of accomplishing a task or attaining a goal successfully is very important in every human endeavor. It is the art of accomplishing a task or attaining a goal successfully. Students' achievement is defined as the competence of an individual in an area of content (American Educational Research Association, American Psychological Association and National Council on Measurement in Education, 1999). Achievement is dependent upon several factors, among which are instructional methods, learning environment, motivation for stimulating students' interest in learning and the learners (Felder, 2002).

The introduction of ICT, has brought about a new trend in teaching and learning process. One of the trends is the integration of technology into instructional process, which has been proved to have strong and useful effects on students' achievements. Academic institutions across the world are currently using ICT strategies to improve instructional delivery. One of such strategies is the application of flipped classroom model on Learning Management Systems (LMS) for enhancing students' academic achievement.

Researches have showed that flipped classroom technique using learning management system/online tools has the potential of increasing students' interest in learning and meeting their learning needs (Phillips, & Trainor, 2014). Flipped classroom is an innovative method which moves lectures outside the four walls of the classroom, and moves framework and practice back into the classroom, by involving lecturers to post lecture courseware (text-book, audio, audio, audio-visual etc.) on LMS and giving students the opportunity to download and watch lecture supplemental videos, and attempt assignments, projects and workshop outside the classroom settings (Srayer, 2007; Zhao, Deng & Zzhai, 2016). Flipped classroom on LMS has the advantages of giving students the freedom of choosing the most suitable ways to acquire new knowledge it prompts the method of imparting knowledge to students outside the classroom as well as the process of internalization of knowledge inside the classroom by lecturers and students. In this way, lecturers and students communicate, collaborate, produce thought collusions and enter into deeper levels of real time study inside the classroom (Zhou, 2011; Liu, Zhang & Fan, 2013). Flipped classroom on LMS can therefore, be an effective method for teaching Elements of Accounting to

students in universities because the method has the potential to improving students' interest and achievement in the subject.

Flipped classroom technique on LMS is an excellent technique for teaching procedural knowledge (i.e. step-by-step approach of solving problem) like solving an accounting problem (Milman, 2012). Flipping classroom using LMS can be possible in Nigeria universities because of the increased awareness and availability of information and communication technology and e-learning resources in most of the universities. Therefore, it is expedient to determine the students' interest and achievement with regard to flipping classroom on LMS model in teaching and learning of accounting courses in University of Nigeria, Nsukka and Nnamdi Azikiwe University, Awka. The major focus of this research is to find out if students' interest and achievement in Elements of Accounting can be improved so as to achieve higher academic performance using flipped classroom technique on LMS.

1.1. Learning Management Systems (LMS)

In today's academic world, one of the learning environments that have gained acceptance is the learning management system (LMS). A learning management system is also referred to as a Virtual Learning Environment, Course Management System or Learning Platforms (Paulsen, 2003; & Khambari, Moses, Khodaband, Ali, Wong, & Ayub, 2010). Nair and Patil (2012) defined LMS as a set of software tools and Web-based technology that support planning, implementation, delivery, tracking and managing of online education and training as well as assessing a specific learning process. The authors added that an LMS has the options that support systems for managing training records, and also contain some flexible software that enhances course distribution over the Internet as well as features which promote online authoring. A learning management system offers a lecturer the opportunity to create and deliver content, track students' participation in the learning process, and also evaluate their performance.

In the opinion of Hall (2003), an LMS is a software that automates the administration of training events. Aboderin (2013) defined LMS as a global term relating to a computer system that is purposefully designed for administering online courses, distributing course contents and supporting collaboration between teachers and their students. According to Ayub, Rohani, Wan Marzuki, Wan Zah and Wong (2010), a learning management system is a web-based technology,

which supports users to plan, distribute, and evaluate a specific learning process. The authors added, that it is a software environment specifically developed to organize user learning interventions, deliver learning content as well as resources to students and trainees. In the views of Greenberg (2002), Alias and Zainuddin (2005), an LMS is a high-level web-based technology solution used for planning, conveying and also for managing diverse learning events and activities within an institution. Such events, according to the authors, include: online teaching, virtual classroom, and lecturer-led courses that can measure a definite learning process. Similarly, Wahlstedt and Honkaranta in Adzharuddin and Ling (2013) noted that the LMS is made up of pedagogical devices, learning contents, human interactions, and assessment supporting and advancing traditional learning in higher institutions. Operationally, an LMS is an electronic content distribution system that enables lecturers, instructors, and course creators distribute their soft course wares online, interact, deliver, assess and elicit feedback from the students irrespective of where the students are. It is a non-conventional approach to instructional delivery which allows learners to learn at their pace and yet meet up with the set educational objectives.

There are several learning management systems that support teaching and learning. Some of them include; Desire2Learn, METU Online, Moodle, Its Learning, Blackboard, Claroline, Formare, WebCT, Sakay, Chisimba, Learning Space, High Learn, First Class, eCollege, Dokeos, KEWL, Class Fronter, Edmodo, Schoology, Desmos, and Canvas among others (Babo, & Azevedo, 2011; Usman, 2016). However, the most popularly used learning management systems as contained in a research survey carried out in 2009 in 51 universities from 19 countries in 5 continents include; Moodle, Blackboard, WebCT, and Sakay (Babo, & Azevedo, 2011). In the same vein, Paulsen (2002) identified 8 most used commercial learning management systems in Europe with the number of institutions using them. They include; ClassFronter (16 institutions), TopClass (7 institutions), LUVIT (5 institutions), and Tutor2000 (5 institutions) for the European, while, WebCT (20 institutions), BlackBoard (14 institutions), FirstClass (7 institutions), and Lotus Learning Space (6 institutions) for the North American. In this study, Moodle Learning Management Systems was used to teach the students Elements of Accounting because it has features like forum, quiz, link, wiki, video conferencing, announcement, etc. which are interactive and can promote students' interest in learning.

The LMS contains several interactive features which include; threaded discussions, video conferencing, chat, database, wikis, glossary, quiz, announcement, forums, assignment, grades and

feedback to students, hyperlinks for connecting other websites, emailing and messaging, uploading features for course wares etc. which allow the lecturers and students to engage in active teaching and learning process (Babo, & Azevedo, 2011; Nair, & Patil, 2012). These features have made the LMS beneficial to both the faculty and students. The benefit of the LMS in teaching and learning process has led to its high popularity and usability in tertiary institutions in different parts of the world (Almarashdeh, Sahari, Zin, & Alsmadi, 2010; Babo, & Azevedo, 2011; Nair, & Patil, 2012). LMS has a great capacity as a learning environment to promote pedagogical practices within or outside the classroom setting and can optimally improve students' academic achievement. Research has shown that much of the success recorded through e-learning has been ascribed to the availability of the learning management system (Paulsen, 2003). An LMS helps an institution to design an e-learning courseware for students, to deliver the course, test, and evaluate the students electronically and equally produce electronically students' databases upon which their results and progress could be statistically charted (Paulsen, 2003). Similarly, LMS has the potential to enhance students' quality of learning, and can assist in improving their interest and performance (Appana, 2008; Moses, Ali, and Krauss, 2014). It can also assist in improving teaching and learning opportunities for both the faculty and students (Hrabowski, Suess, & Fritz, 2011; Mattingly, Rice, & Berg, 2012). Dietz-Uhler, and Hurn (2013) noted that through close monitoring of student performance and participation in a course on LMS, a faculty can identify areas that require improvement in a course and can as well trace how the students' participation is influencing their academic grades and general performance.

Many Nigerian universities have started embracing the use of LMS to enrich their academic activities. Those universities include: University of Nigeria, Nsukka; University of Lagos, and University of Jos, among others (<http://moodle.unn.edu.ng/>; <http://moodle.unilag.edu.ng/>; <http://elearn.unijos.edu.ng/>). Hence, millions of Nigerian students and lecturers easily gain access to digital networks, computers, and electronic communication technologies at home, cyber cafes or using the institutional mobile network mainly for communicating with colleagues and to additional consultations online for educational resources. (Waycott, Bennett, Kennedy, Dalga, & Gray, 2010; Margaryan, Littlejohn, & Vojt, 2011; Adzharuddin & Ling, 2013). However, the lecturers are not yet found to be using the digital networks and other electronic communication technologies for teaching and learning only, since they still cling to the traditional method of f2f delivery system. The rate at which the university students and lecturers are craving for ICT is a

clear proof that the Nigerian academic environment is no longer an arena where the learners are limited to acquiring of knowledge on the bricks and mortar using only the conventional slate and chalk. One of the best approach to integrating LMS in instructional delivery is by using flipped classroom approach.

1.2. Flipped Classroom

Flipped classroom involves a lecturer posting lecture course wares (text-based, audio, audio-visual etc.) on the LMS and giving the students the opportunity to download, watch supplemental videos, and attempt assignments outside class setting. Strayer (2007) defined flipped classroom as an innovative classroom structure which moves lectures outside the classroom through modern technology, and moves homework and practice with concepts to the classroom via learning activities. Zhao, Deng and Zhai (2016) see flipped classroom as a new paradigm of blended-learning. According to the authors it enhances integration of information technology with innovative teaching concepts. It provides a framework of ideas and directions to improve teaching of courses and also construct high-effective classroom. Flipped classroom has several advantages which include, giving students freedom and allowing them to choose the most suitable ways to acquire new knowledge, and promote the process of imparting knowledge outside the classroom (Zhou, 2011). It also promotes the process of knowledge internalization inside the classroom by creating a good opportunity for lecturers and students to communicate, produce thought collisions, and also enter into deeper levels of real time study. According to Liu, Zhang, Fan (2013), flipped classroom reduces the distance between a lecturer and his students, and also between students and other students. It equally leads to improved learning outcome. This is because most activities are task driven, thus students could set their goals and work hard to achieve them.

Zhao, Deng and Zhai (2016) noted that flipped classroom uses elements such as situation and cooperation to help in active participation of students in teaching and learning process. In flipped classroom, with the aid of information technology, a lecturer can provide study resources in form of teaching videos online which students can download, watch and learn prior to the lecture period. During the lecture, the knowledge is further internalized as the lecturer and students actively participate in the in-class-activities like homework question-answering, case analysis and also brainstorming and interaction. Flipped classroom helps to promote effective Research and Development (R & D) of teaching and learning resources which can easily be accessed by the

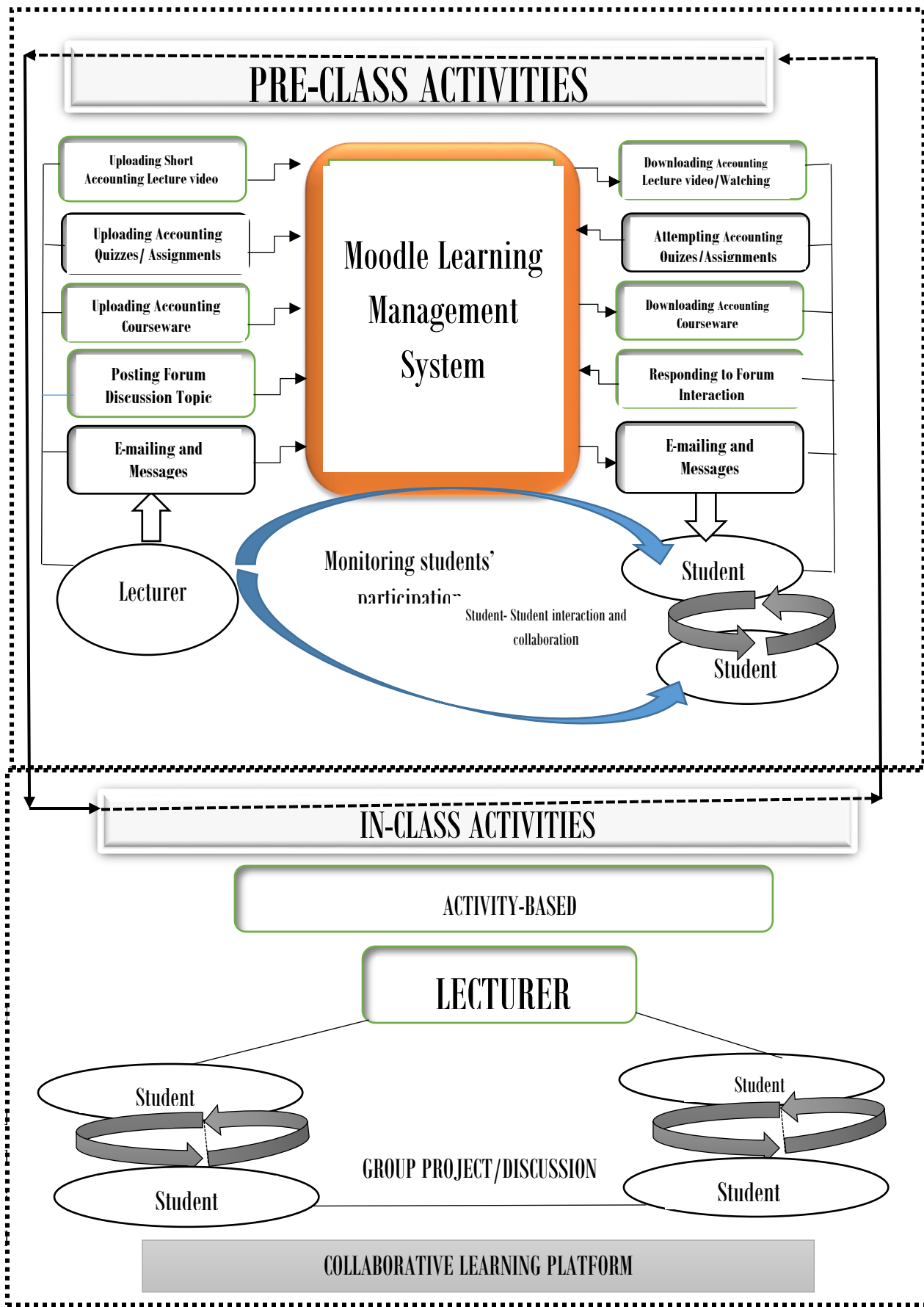
students through the internet. In flipped classroom, students are given permission to download course materials posted on the LMS platform or emailed to them (Strayer, 2007; Liu, Zhang, & Fan, 2013). In this way they can undertake multiple activities when they come to class, such as expressing their thoughts, and interacting with others to strengthen their understanding of the content of the downloaded course content. Strayer (2007) further added that individual and group projects can also be assigned to the students by the lecturers as take home activities which can be done on the LMS environment or offline.

1.3. Elements of Accounting

Elements of Accounting is the first introductory and foundational accounting course taught in tertiary institutions in Nigeria. It is an introductory course to all other undergraduate accounting courses offered in the Departments of Business Education and Accountancy in the universities. Other accounting courses accounting students are meant to study in the undergraduate programme include: Introduction to Financial Accounting, Financial Accounting, Advance Financial Accounting, Cost and Management Accounting, Taxation, International Accounting, Public Sector Accounting, and Auditing and Investigation (Department of Accountancy, 2013). Elements of Accounting is suitable for introducing newly admitted students into accounting courses because it covers the basic accounting principles and conventions, cashbook, double entry system of account, trading, profit and loss account, ledger, balance sheet, suspense account, bank reconciliation, correction of errors, among others (Longe & Kazeem, 2012). The goal of teaching Elements of accounting at the universities is enshrined in the general purpose for teaching accounting courses. These objectives are in line with the goals of the Nigerian tertiary education as contained in the National Policy on Education, which is developing a high level manpower training, development and inculcation of right type of values for the survival of Nigeria society and the individuals with physical, and intellectual skills that can help them to become self-reliant and resourceful members of the Nigerian society (Federal Government of Nigeria, 2004). In line with this, universities offer Element of Accounting to prepare undergraduates for gainful employment and advancement in accounting profession and career.

Students' achievement in Elements of Accounting has significant effects on their future performance in other accounting courses mentioned above. Unfortunately, the students'

performance in the course has been grossly poor. The poor performance of the students have been attributed to poor instructional methods and techniques used by the accounting lecturers, students' poor background in accounting from secondary school and learning environment (Akenbor, 2014). Akenbor (2014) noted that most accounting students tend to have a negative attitude towards accounting courses because they believe that the courses are very complex and difficult, and involves a lot of calculations and several details.



Akenbor (2014) noted that most accounting students tend to have a negative attitude towards accounting courses because they believed that the courses are very complex and difficult and involves a lot of calculations and several details of calculations.

Effective teaching of Elements of Accounting therefore, requires that accounting lecturers should employ different instructional techniques that are interesting, meaningful and can motivate the students to learn. A preliminary study conducted by the researchers revealed that the goal of teaching and learning of Elements of Accounting in Nigeria Universities is yet to be actualized mainly due to the instructional approaches adopted by the lecturers which always reflect in the students' academic achievement. This is evidenced from the performance of accounting students from the two universities studied. The researchers observed from the schools' (University of Nigeria, Nsukka and Namdi Azikiwe University, Awka) records that between 2013/14 to 2015/16 academic session, 534 first year accounting students from the two institutions studied took Elements of Accounting examinations. However, out of the 534 students, only 3.75% of them made an A grade, 13.86% had B grade, 20.22% C, while 20.78%, 11.79% and 30.15% made D, E and F grades respectively (see Fig. 2) below.

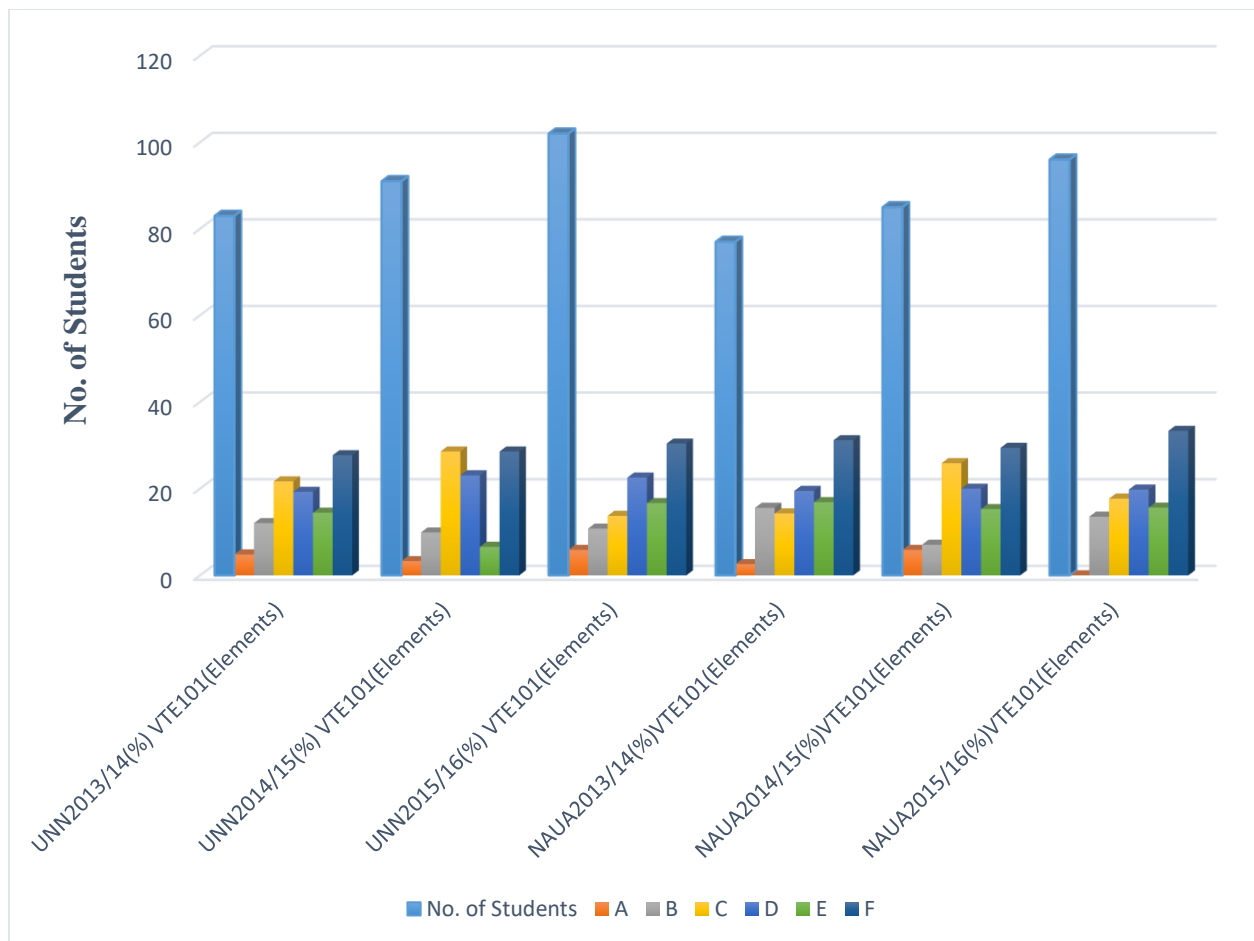


Figure.2. *Students’ performance in VTE 101 Elements of Accounting between 2013/14 – 2015/16 academic sessions. Source: Departments of Business Education, University of Nigeria, Nsukka (UNN) and Nnamdi Azikiwe University, Awka (NAUA) as at May, 2017.*

A careful analysis of the students’ achievement as depicted in fig. 2 above, showed that majority of these students had grades from “D” to “F” (62.72%). This is alarming as such results are clear proof of students’ poor learning achievement which negates manpower development in accounting practices.

Okafor (2012) noted that meeting the manpower shortfall in accounting practices implies that the accounting lecturers should equip accounting students with three complementing competencies namely: education, skills and attitudes. To achieve this requires that Nigerian universities and accounting lecturers should redesign learning in such a way that students learning experience can go beyond the conventional lecture rooms and the usual lecture method (f2f

methods). Research has shown that the conventional f2f lecture method lacks learner-centered approach and as such it does not bring out the best in students and cannot guarantee their learning capabilities (Campbell, Campbell, & Dickinson, 1999). Stanford (2003) concurred that f2f method commonly used by lecturers in teaching and learning impairs students' interest in learning and lead to frustration, learning difficulties, and in extreme cases make students dodge lectures. Therefore, to build students' interest in introductory accounting, accounting lecturers should be encouraged to diversify teaching and learning process using modern techniques that are learner-centered, interactive, and activity-based such as: flipped classroom model on LMS.

1.4. Research Questions

1. What is the effect of flipped classroom model on Moodle learning management systems on students' interest in Elements of Accounting?
2. What is the effect of flipped classroom model on Moodle learning management systems on students' achievement in Elements of Accounting?
3. What is the effect of gender on academic achievement of students' taught Elements of Accounting using flipped classroom model on Moodle learning management systems?

1.5. Hypotheses

The following hypotheses was formulated for this study and wre tested at 0.05 level of significance.

Ho¹: There is no significant difference ($P < 0.05$) in the mean interest scores of students taught Elements of Accounting using learning management systems and those taught using f2f conventional method.

Ho² There is no significant difference ($P < 0.05$) in the achievement scores of students taught Elements of Accounting using learning management systems and those taught using the f2f conventional method.

Ho³ There is no significant difference ($P < 0.05$) in the achievement scores of students taught Elements of Accounting using learning management systems and those taught using the f2f conventional method based on gender.

1.6. Theoretical Framework

This study is anchored on Bandura's Social Learning Theory (SLT). According to the SLT, the individual learners, peers and situations potentially affects learning outcomes (Bandura, 1977). Social learning theory views learning as a social process where individuals will self-initiate, regulate learning and actively construct knowledge by acquiring, generating and structuring information while cooperating with colleagues or peers (Yu et al, 2010). According to Ainin, et al (2015), the social learning theory basically explains how the re-environmental and cognitive components collaborate to affect an individual learning and behavior pattern. The use of flipped classroom model on LMS, according to the SLT, would affect students' academic achievement as they communicate, collaborate and practice concepts in the classroom with peers and lecturers after the online instructions on LMS.

2. Methodology

2.1. Design of the Study

The design of this study is quasi-experimental. Non-equivalent and control groups were used while pretest-posttest were administered to the groups. It was not possible for the researchers to assign randomly the students into treatment groups without disrupting the formally drawn school activities. Hence the researchers deemed it fit to adopt quasi-experimental using intact classes (See table 1 for the pattern adopted). According to Borg, Gall, and Gall (2007) quasi-experimental research design is considered suitable for any research where the researcher cannot randomly sample the population and assign them to treatment groups without interrupting the academic activities of the institutions being used for the study.

Graphical Representation of the Design

Group	Matched	Pretest		Post-test
Treatment Group (X)	M	01	X	02

Control Group (C)	M	01	-	02

Where:

X = Treatment Group.

C = Control Group.

M = The M indicates that students in each group were not randomly assigned to the groups, rather they were matched based on admission entry requirements.

01 = pretest given to the treatment and control groups respectively.

02 = post-test given to treatment and control groups respectively.

X = Treatment (Learning Management System).

- = No treatment.

----- = The broken lines between the two groups indicates that random sampling was not used.

2.2. Area of the Study

This study was carried out in Enugu and Anambra States of Nigeria. Enugu and Anambra States are among the educationally advantaged states in Nigeria because of their educational achievement and number of educational institutions in the states. The states have many public and private universities offering Business Education (accounting option). However, two public universities were selected for this study. They are: University of Nigeria, Nsukka, Enugu State, and Nnamdi Azikiwe University, Awka, Anambra State. The two public universities were selected for the study because they have the learning management system environments that allow for flipped classroom and other ICT resources like e-learning tools, computer laboratories, Wi-Fi, standby generator plants, interactive whiteboards, overhead projectors, as well as accredited programmers required for this study.

2.3. Population

The population for the study consists of all the 168 first-year undergraduate students of the Department of Business Education comprising of 76 males and 92 females from the two public universities selected for the study. The participants were drawn from the registers of the 2015/2016 academic session of the two universities. There was no sampling since the population was manageable and intact groups were involved. Rather than sampling, the researchers randomly assigned the two groups from the two universities into control and treatment groups using simple balloting approach.

2.4. Instrument for Data Collection

The researchers developed an achievement test titled: “Element of Accounts Achievement Test” (EAAT) and interest inventory questionnaire (IIQ). The EAAT is a 53-item objective test (with four options) administered on the Learning Management System (Moodle) platform and F2F conventional test approach to the experimental and control groups respectively. EAAT was designed to have content validity and coverage of the various topic selected for the study. The researchers used individual item analysis to determine the psychometric properties of the instrument (EAAT) items used. This is supported by Nworgu (1992), who postulated that an item can be considered suitable for research if it has a difficulty index ranging from $p0.30 - p0.70$, a discrimination index of $p0.1 - p1.0$, and with a negative index distractor. Similarly, Okoro (2006) observed that a distractor with a negative index is a good distractor but any distractor with a positive index is considered as a poor distractor. The author also affirmed that a distractor could be seen as a useless distractor if it has a zero index. This is because such distractor does not attract any student from the group.

On the other hand, the IIQ is a 25 item questionnaire that was administered to the experimental and control groups before and after the treatment to elicit information on students’ interest level in accounting. The instrument also considered if there is any significant difference in students’ interest in accounting based on gender.

2.5. Validation of the Instrument

The EAAT was face validated by 3 experts, 2 from the Department of Business Education, University of Nigeria, Nsukka, Enugu State, and 1 from the Department of Vocational Education, Nnamdi Azikiwe University, Awka, Anambra State. The experts were given the purpose of the study alongside the EAAT and IIT were asked to validate the items by making their inputs, in form of corrections, and suggestions with regard to structure of items, and objectivity of questions so that the items will be suitable for data collections. Their suggestions, corrections and recommendations were incorporated to produce the final copy of EAAT. This is in agreement with the view of Azuka (2011) that a researcher can use colleagues or experts who are knowledgeable in a field of study to validate instrument items, and to ensure that both face and content validity of the instrument is guaranteed for data collection.

The instrument (EAAT) was further subjected to content validation. Content validation was considered important in this study because it helps to determine if the test items were true representatives of samples of all the traits measured (Azuka, 2011) and more so, content validity is one of the most important and suitable form of validity in an achievement test (Nworgu, 1992; Okwo, 2017). In content validation, the following areas of the introductory accounting were considered: accounting concepts and convention, books of account, correction of errors and use of suspense account, capital expenditure and revenue expenditure, final accounts - trading and profit and loss accounts, balance sheet, and bank reconciliation.

The EAAT covered the above topics and was constructed using Test Blueprint/Table of Specification. The importance of Test blueprint in construction of achievement test is to prevent a researcher from developing a test that is biased, and also to build content validity into the test. In constructing the test items, the researchers considered the 5 objectives of cognitive domain. This is in agreement with Nworgu (1992) that content validity can be assured in an achievement test if the objectives of cognitive domain (knowledge, comprehension, application, analysis, synthesis and evaluation) are taken into consideration while developing test items.

2.6. Reliability of the Instrument

The reliability of the instrument was determined using Kuder-Richardson (K-R 20) test. The EAAT and IIQ were administered to 30 Accounting Education students at Ebonyi State University (EBSU), Abakaliki, Ebonyi State. These respondents were not part of the population for the study. The data collected were used to compute the reliability coefficient of the instrument using Statistical Package for Social Science (SPSS). Cronbach's Alpha was used to establish the reliability of the IIT instrument. Hence the internal consistency was determined based on the closeness of the Cronbach's Alpha to 1. Any item that is closer to 1 is considered to have a higher internal consistency. A reliability index of 0.79 was obtained and is considered high in the view of Sekaran (2003), who affirmed that any coefficient that is 0.6 is poor, 0.7 is considered acceptable, while 0.8 and over is considered as good. K-R20 is chosen for the study because it is assumed that all the items of the EAAT have an unequal difficult levels. This is in agreement with Traub (1994) who argued that instrument items with no equal 'successes' proportions have better reliability estimate than K-R21 estimates. The researchers decided to use this method because it helps to determine the internal consistency of the instrument. Hence, the following formula for calculating K-R 20 was used.

$$K-R\ 20 = \frac{n}{n-1} \left[\frac{1 - \sum pq}{sx^2} \right]$$

Where

n = no of items in a test

P = proportion of students who correctly answered an item

q = proportion of students who incorrectly answered an item (q = 1- p)

pq = Variance of a single item scored dichotomously (i.e. correct and wrong)

sx^2 = P variance of the total test

Σ = Summation sign showing that pq is summed over all items

2.7. Experimental procedure

For effective outcome of research result, the researchers were divided into two groups. One of the groups participated in development of the Moodle learning management systems model, enrollment of students to LMS online course platform (Moodle), uploading of courseware and test

instrument, as well as administering of Computer-based test (CBT) to the 100 level accounting students of the Department of Business Education, University of Nigeria, Nsukka who were offering Elements of Accounting. The second group conducted training for accounting lecturers who administering the pretest and post-test instruments to the experimental and control groups. To ensure homogeneity in instructional delivery to both groups, all the researchers and the lecturers of the experimental group met for two days to harmonize instructional delivery methods and strategies to be used for the groups. The lesson notes were developed by the researchers in line with the undergraduates' accounting curriculum and they covered the following topics: introduction to bookkeeping and accounting; accounting concepts and conventions; books of accounts; correction of errors and suspense account; final accounts and balance sheet; as well as bank reconciliation statement. In order to achieve a standardized and uniformity in instructional delivery among the accounting lecturers used, and to control lecturers' variability and extraneous factor to this study. The following approach was adopted: all the researchers and lecturers who participated in administering the CBT and F2F achievement tests were made to pilot test the teaching process, using an equivalent group before the commencement of the experiment.

First year students of the Department of Business Education, University of Nigeria, Nsukka were used as experimental group, while the first year students of the Department of Business Education, Nnamdi Azikiwe, Awka, were the control group. The researchers used random balloting technique to select the experimental and control groups respectively. It is believed that these groups share common characteristics and the same mode of admission into the university. The basic requirement for admitting any student into the Department of Business Education in Nigerian Universities include: "candidates must have credit passes in five subjects obtained at SSCE/NECO/ NABTEB/GCE O' Level which must include English Language, Mathematics and any of the following subjects: Economics, Commerce, Government, Office Practice, Insurance, Marketing, Store Management, Sales Manship, Data Processing and Principles of Accounting" (University of Nigeria, Nsukka, Department of Business Education, 2016). The five credits must be obtained in not more than two sittings. Also, the candidate must obtain a minimum of 200 marks in Unified Tertiary Matriculation Examination (UTME) (Joint and Matriculation Board, 2016). It is therefore, believed that all the first year students of the Department of Business Education in both universities must have fulfilled the above criteria before they were admitted in their various institutions. These students were used for this study because they all offer Elements of Accounting

as a foundational accounting course in their first year. However, none of them were told that they were used for experiment.

The students of the Department of Business Education, University of Nigeria, Nsukka (treatment/experimental group) were taught using flipped classroom approach on Moodle Learning Management System. The flipped model was designed by the researchers. On the other hand, the control group i.e. first year students of the Department of Business Education, Nnamdi Azikiwe, Awka were taught using the conventional F2F teaching approach. Pretest (EAAT) was administered to both the treatment and control groups on the first day of the experiment prior to the treatment. Afterwards, the treatment group was taught using the flipped classroom model on Moodle LMS while F2F teaching method only was used to teach the control group. Each of the groups were taught for a period of 12 weeks. For the treatment group, the flipped classroom model integrated with the F2F and online approach (Moodle LMS model). Course ware, students' home works, and lecture video clips recorded by the researchers were uploaded weekly on the Moodle learning management environment for the students to download, study, and to attempt their assignments before the next lecture. General revision covered the 13th and 14th weeks of the study, while the post-test was administered on the 15th week. The test items were rearranged manually for the control group to avoid students noticing that it was the same questions that were administered to them before the experiment. As for the treatment group, Moodle has an inbuilt setting that shuffles question numbering and multiple choice options such that question 1 might become question 7 after the pretest had been attempted. So the researchers used the Moodle settings to reassign numbers and to change multiple choice options too. The reason for this is to make sure that none of the groups will not know that it was the same test that was administered to them before the one they were attempting in the present.

2.8. Method of Data Collection

The data for the research was the CBT and F2F tests scores obtained from the pretest and post-test administered to 100 level undergraduate students of the two public universities that were used for the study. The CBTs were administered using Moodle learning management systems (an e-learning platform of the University of Nigeria, Nsukka), while the F2F tests were administered

following the conventional achievement test approach. However, all the course lecturers from the Nnamdi Azikiwe universities, Awka who were used for the study were briefed on the procedures for administering both the pretest and the post-test achievement test. The reason for briefing the lecturers was to enable them guide and prevent the students from knowing that they were used for experiment.

2.9. Method of Data Analysis

The data for the study were analyzed using the descriptive statistic of mean (\bar{X}) in order to answer the research questions, while ANCOVA was used to test the hypotheses at 0.05 level of significance. Also, the mean gain of the two groups on the pretest-posttest was analyzed. The analysis was done with the aid of the Statistical Package for Social Sciences (SPSS) version 2.0. ANCOVA helps researchers to remove the initial differences recorded between the experimental groups, in such a way that pretest groups can easily be assumed to be equivalent thus, removing score discrepancies in the pretest performance in all the groups and taking away any source variation between-group. Fraenkel and Wallen (2009) affirmed that ANCOVA is a variation of ANOVA that can be employed for data analysis when experimental groups are given pretest (covariate) that are related to dependent variable such that the groups mean scores on the pretest differ. The authors added that ANCOVA enables the researchers to make an adjustment on the post-test scores on the dependent variables for the groups so as to compensate for the initial differences recorded by each of the groups on the pretest. ANCOVA is considered suitable for this analysis because intact classes were used and, therefore, the statistical tool helped the researchers to analysis the discrepancy between the main effects of the treatment on the dependent variable and to adjust the non-equivalence that occurred as a result of the pretest and post-test that were administered to the intact groups. Also, ANCOVA helped the researchers to compare the mean of the experimental groups. For the decision rule, the null hypothesis was not rejected if P-value is greater than or equal to the criterion 0.05 level of significance, otherwise the null hypothesis was rejected.

3. Results

The results of this study are presented in the following tables:

Table 1

Mean of Pretest and Posttest Scores of Students Taught Elements of Accounting Using Flipped Classroom Model on LMS and Conventional F2F Methods in Universities in Enugu and Anambra States, Nigeria

Group	No	Pretest		Posttest		Mean Gain (mg)
		X $\bar{}$	SD	X $\bar{}$	SD	
Treatment	95	3.04	1.28	5.16	.84	2.12
Control	73	2.60	1.42	2.75	1.49	0.15

Table 1 above showed the mean and standard deviation of pretest and posttest scores of both the treatment and control groups who were taught Elements of Accounting using Flipped Classroom Model on LMS, and Conventional (F2F) method. The focus of the researchers was to ascertain if significant difference exist in the mean achievement scores of students taught Elements of Accounting using flipped classroom model and f2f method. The data presented in Table 1 above, revealed achievement mean gain (Mg) of 2.12 and standard deviation gain (SDg) of 1.28 of 95 students in the experimental group, which is substantially higher than Mg 0.15 and SDg 0.07 of 73 students in the control group. Based on these findings, it is empirically clear that Flipped Classroom Model on LMS is more effective for teaching Elements of Accounting than the conventional f2f approach because of its potentials in improving students' academic achievement.

Table 2

Analysis of Covariance (ANCOVA) for Test of Significance between the Mean Scores of Experimental and Control groups in Elements of Accounting Achievement Test.

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	357.016a	2	178.508	273.138	.000
Intercept	145.572	1	145.572	222.742	.000

Pretest	118.358	1	118.358	181.102	.000
Participants	182.114	1	182.114	278.655	.000
Error	107.835	165	.654		
Total	3307.000	168			
Corrected Total	464.851	167			

a. R Squared = .768 (Adjusted R Squared = .765)

Table 2 above presented data for determining whether the two groups are significantly different in terms of their mean scores on the dependent variable (posttest). The result showed that the F-calculated value for the treatment and control groups was significant $F(1, 165) = 278.655, p < 0.05$. Therefore, we reject the null hypothesis of no significant difference and accept the alternative hypothesis that significant difference exist between the mean achievement scores of treatment and control groups in Elements of Accounting. The significant difference arose from the higher mean gain made by the experimental group than the control group.

Table 3

Mean of Pretest and Posttest Scores of Students Taught Elements of Accounting using Flipped Classroom Model on LMS and F2F Method Based on Gender.

Gender	Flipped Classroom Model on LMS					Conventional (F2F) Method				
	<u>Pretest</u>		<u>Posttest</u>		<u>Mean Gain</u>	<u>Pretest</u>		<u>Posttest</u>		<u>Mean Gain</u>
	\bar{X}	SD	\bar{X}	SD	(Mg)	\bar{X}	SD	\bar{X}	SD	(Mg)
Male	3.00	1.17	5.19	.79	2.19	2.54	1.33	3.08	1.57	-0.54
Female	3.07	1.35	5.14	.88	2.07	2.64	1.48	2.57	1.43	0.07

Table 3 presented data that enabled the researchers to determine if there is any significant effect of the 2 approaches used in teaching the students (male and female). The result of the table also assisted the researchers to ascertain if students' performance in the achievement test in Elements of Accounting can be significantly influenced by gender if both are exposed to the same treatment. Table 3 revealed that the male students taught Elements of Accounting using flipped classroom model on LMS had mean of 3.00, SD 1.17 and mean 5.19 and SD .79 for the pretest and posttest respectively. Thereby making an overall mean gain of 2.19 in both tests. Conversely,

the female counterparts who received the same treatment conditions made a mean of 3.07, and SD 1.35 for the pretest and mean of 5.14 and SD .88 for the post-test. Thus achieving a mean gain of 2.07 in both tests. On the other hand, in the control group, male students had an achievement mean of 2.54, SD 1.33 from the pretest and mean of 3.08 and SD 1.57 from the posttest. The overall achievement mean gain for the male in control group is - 0.54. Still on the control group, the female students taught Elements of Accounting using F2F method obtained mean of 2.64, and SD 1.48 from the pretest, and mean of 2.57, and SD 1.43 from the posttest. Thus, making a total mean gain of 0.07 from both tests.

The general outcome is that male students obtained a higher achievement mean than their female counterpart. Therefore, the researchers inferred that gender has significant influence on students' achievement in Elements of Accounting when flipped classroom model on LMS and f2f approach are used.

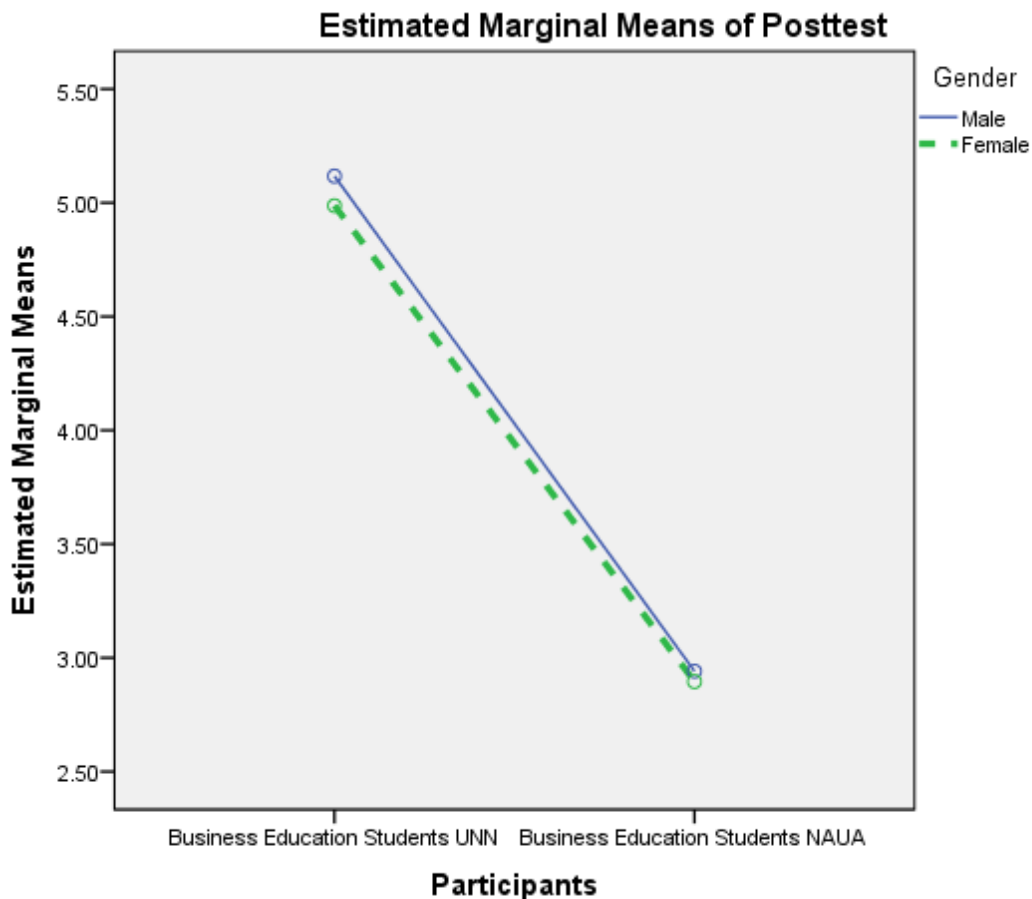
Table 4

ANCOVA Analysis and Interaction Effect of Gender on Mean Scores of Students Taught Elements of Accounting using Flipped Classroom Model on LMS and Conventional F2F Method

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	357.415 ^a	4	89.354	135.565	.000
Intercept	143.331	1	143.331	217.457	.000
Pretest	117.106	1	117.106	177.671	.000
Participants	168.920	1	168.920	256.281	.000
Gender	.285	1	.285	.432	.512
Participants * Gender	.067	1	.067	.102	.750
Error	107.437	163	.659		
Total	3307.000	168			
Corrected Total	464.851	167			

a. R Squared = .769 (Adjusted R Squared = .763)

Table 4 presents the F-cal. values for mean scores of all the participants (i.e. treatment & control groups) in the pretest and posttest. It equally showed the gender (male and female) and the relative significance of the treatment based on the gender on academic achievement of the students in Elements of Accounting. Similarly, the F-calculated value for gender $F(1, 167) = 0.432$; $p > 0.05$, 95% CI. Thus, there is no statistical significance between the effects of gender on students' achievement in Elements of Accounting. Similarly, the interaction effect of treatment and gender revealed $F(1, 167) = 0.102$; $p > 0.05$. This indicates that the students mean scores in the achievement test showed that there is no significant interaction effect of treatment given to them on the basis of gender.



Covariates appearing in the model are evaluated at the following values: Pretest = 2.8512

Fig: 3. Estimated Marginal Means of the Posttest Achievement.

The above graph represents the adjusted means for the posttest, split for gender (male and female) and the treatment. It is clearly from the graph that the independent variables had a linear plot. The male had mean rating of 5.19, while the female obtained 5.14. However, it could be said that the males performed better than the females in the achievement test, but the gap in their performance is not statistically significant. This shows that flipped classroom model on LMS has attributable effect on both males and females.

Table 5:

Mean and Standard Deviation of Interest Scores of Pretest and Posttest of Students Taught Elements of Accounting using Flipped Classroom Model on LMS and F2F Method Based on Interest.

Groups	No	Pretest		Posttest		Gained Mean (Mg)
		\bar{X}	SD	\bar{X}	SD	
Experimental Group	96	2.16	.83	4.50	.56	2.34
Control Group	73	2.00	.75	1.73	.63	-.27

Table 5 presents the mean scores on interest inventory questionnaire administered to the experimental and control groups before and after treatment to ascertain the students' interest level on accounting based on the 2 teaching methods used for the study. It also showed mean interest change (mean gain) obtained. The table revealed that the experimental group who were taught Elements of Accounting using flipped classroom on LMS recorded a mean interest of 2.16 and 4.50, and standard deviation of .83 and .56 for pretest and posttest on interest inventory. This shows 2.34 mean gain on interest. On the other hand, the control group who were taught Elements of Accounting using f2f approach had a mean rating of 2.00 and 1.73, and standard deviation of .75 and .63 for pretest and posttest on interest inventory. The group also recorded -.27 mean gain on interest. From the findings of this study, the researchers inferred that flipped classroom on LMS has the capacity of increasing students interest in learning of accounting.

Table 6:

Analysis of Covariance (ANCOVA) for Test of Interest Levels of the Participants (Experimental and Control groups) Taught Elements of Accounting with Flipped Classroom on LMS and F2F Method.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	294.200a	4	73.550	180.889	.000	.816
Intercept	189.135	1	189.135	465.158	.000	.741
Pretestinteresta	.382	1	.382	.939	.334	.006
Teachingmethods	266.116	1	266.116	654.486	.000	.801
Gender	.015	1	.015	.038	.846	.000
Teachingmethods * Gender	.025	1	.025	.060	.806	.000
Error	66.276	163	.407			
Total	2148.000	168				
Corrected Total	360.476	167				

a. R Squared = .816 (Adjusted R Squared = .812)

Table 6 presented Analysis of Covariance of students' interest level in the two learning environments (flipped classroom on LMS, and f2f) used in this study. The result revealed that the F-calculated value for gender (male and female) in both treatment and control groups were significant $F(1, 167) = .038$, $p < 0.05$. Therefore, we reject the null hypothesis of no significant difference and accept the alternative hypothesis indicating that there is significant difference on the effect of flipped classroom on LMS, and f2f approach on interest level of the male and female students in Elements of Accounting. Similarly, the interaction effect of the 2 teaching methods on students' interest revealed $F(1, 167) = 0.60$; $P > 0.05$. This indicates that there is significant difference in interest level of the 2 groups of students taught Elements of Accounting using flipped classroom on LMS, and f2f approach.

4. Discussion of Findings

The result of this study revealed that flipped classroom model on LMS has significant effect on students' academic achievement in Elements of Accounting than the conventional (f2f) method. From the research findings, the researchers observed that the gap between the main effect of flipped classroom model on LMS and the conventional (f2f) method was obvious and statistically significant. The implication of this finding is that flipped classroom model on LMS is more effective than conventional (f2f) method in improving students' achievement in Elements of Accounting. The finding of this study validates the position of Liu, Zhang, Fan (2013) that flipped classroom reduces the distance between a lecturer and his students, and also between students, and other students, as well as improving learning outcome of the students. The finding is also congruent with Almarashdeh, Sahari, Zin, and Alsmadi (2010); Nair, and Patil 2012) who postulated that LMS has a great capacity to promote pedagogical practices within or outside the classroom setting, and can optimally improve students' academic achievement. This could be ascribed to the active involvement and participation of the students in the homework activities and the continuous learning and watching of lecture video clips posted on the LMS platform. Most students are interested in computer-based activities, interacting with online materials even with their phones. They could access lecture materials posted on LMS using their phones. This finding also affirmed the assertions of Strayer (2007) who posited that in flipped classroom using LMS platform, students are given permission to download course materials posted on the LMS platform or e-mailed to them. Strayer also observed that in this way students can undertake multiple activities when they come to class, such as expressing their thoughts, and interacting with others to strengthen their understanding of the content of the downloaded course content. This finding is in agreement with Kuh (2009) that tertiary institutions can directly influence effective learning culture in undergraduate education by creating platforms that enhances both students and faculty interactions and students to student collaborative learning, which will ultimately improve learning interest and achievement of students.

In addition, the study revealed that academic achievements of male and female students in the treatment group who were taught using flipped classroom model on LMS were higher than their counterparts in the control group. The ANCOVA result also affirmed that difference exists between the achievement scores of male and female students in Elements of Accounting when taught using flipped classroom on LMS. However, the difference was not statistically significant

as both male and female mean scores are far more than that of the control group who were taught using conventional (f2f) method. Furthermore, the study found no evidence of significant interaction effect of gender and treatment on students' achievement.

The findings of the study on students' interest in accounting using interest inventory showed that flipped classroom on LMS has the capacity of increasing students interest in learning of accounting. The result revealed that interest of the students taught Elements of Accounting using flipped classroom model on LMS increased after being exposed to treatment. This unlike the control group that recorded a negative interest in the posttest interest inventory.

The findings of the study on students' interest is in congruence with Anyagh and Okwu (2011); Imoko and Agwagah (2006); Iyekekpolor (2007) that there factors such as text-book, curriculum, teachers, and environment among others can mar or improve students' interest and achievement in education. This findings also support Okigbo and Okeke (2011) who postulated that interest is a mother of attention. The authors added that if students' interest increase in any given course, their attention will also increase, thus giving rise to effective learning and better academic achievements. The implication therefore, is that accounting lecturers should carefully articulate learning activities and environment in such a way that they can capture students' interest (Attamah, 2012).

Furthermore, the result of the findings of this study has a far reaching implication on university undergraduate students particularly accounting students. Majority of the students are attracted to learning if there is an amalgam of learning environment particularly when technology is integrated with the conventional (f2f) teaching method. This suggest that faculty and institution managements should implement hybrid learning models that are interactive, active based and which can increase both faulty-students as well as student-student collaboration in teaching and learning process, and improve academic performance of the students.

5. Conclusion

For some few decades now, the world has experienced a phenomenal growth in information and communication technology. Educational institutions and learning environment have also been influenced by digital awareness. Innovations in technology have equally helped in developing modern communication tools that can make teaching and learning easy for both faculty and

students. The integration of computers and other technological tools with the conventional mode to contribute positively to instructional delivery. This has given rise to concepts such as flipped learning, v-learning, electronic learning, internet/online learning, b-learning, and collaborative learning among others. These opportunities have opened academic platforms that are highly integrative, thus, revolutionizing the ways faculty and students can relate with each other over a dispersed geographical locations with the sole aim of achieving improved learning outcome. This research paper has helped to determine the effect of flipped classroom model on LMS on academic achievement and interest of accounting students in introductory accounting as against the conventional f2f method. Based on the findings of this study, the researchers concluded that flipped classroom model on LMS is more effective than the conventional f2f instructional method. The researchers inferred that the high mean gains achieved by the experimental group is as a result of student-to-student interaction, faculty-to-students collaboration, LMS interactive features, and mentoring as well as active-based approach provided by flipped classroom model on LMS.

6. Recommendations

In line with the findings of the study, the following recommendations were made:

1. Universities and other tertiary institutions should implement the use of flipped classroom model on LMS in teaching and learning process particularly on introductory accounting courses like Elements of Accounting.
2. The regulatory bodies on education such as Nigerian University Commission (NUC) and National Commission for Colleges of Education (NCCE) should update their curriculum by integrating flipped classroom model on LMS into the curriculum of Business Education and Accountancy which should be mandatory for accounting lecturers to use in instructional delivery.
3. The Ministry of Education empowered by the federal and state government should make adequate provisions for ICT facilities, online resources, and internet connections in all the public universities to support flipped classroom model on LMS.
4. Workshops, seminars and conferences should be organized by government and institutional authorities to equip lecturers with the needed ICT skills for flipping the classroom on LMS.

APPENDIX A: Supplementary data for the study

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