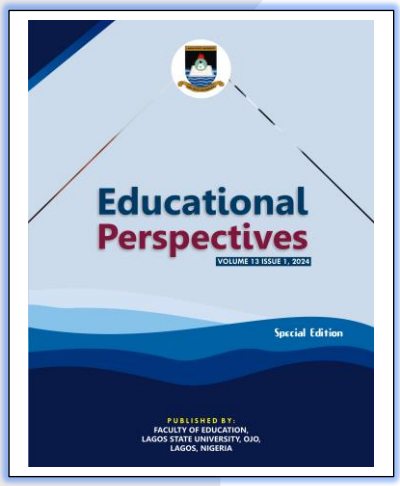

Evaluating Gender Attitude Towards Learning Commerce via Web-Based Instructional Application

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ABSTRACT

This study investigates the effect of a web-based instructional application (WBIA) on Lagos State senior secondary school students' attitude towards commerce. It has been observed over time that researchers focus and identify problems in the field of science giving less attention to the other arms (Commercial and Art) at the senior secondary school level. The purpose of this study is to determine if there is a difference in the attitude of students taught commerce using WBIA and those taught with It, if gender has any effect on attitude. One research questions and one hypothesis were raised to guide this study. This research employs a mixed method design which involves the use of the quantitative. The quantitative part of the study adopted a quasi-experimental design. The study focuses on senior secondary school II Commerce students in Lagos State, Nigeria. A convenience sampling technique was employed to select the representative sample schools. One hundred and eight commerce students including male and female were selected and examined using intact classes. A Web-Based Instructional Application was developed to teach five different topics under commerce, a web-based instructional application questionnaire was used to collect data for this study and was validated. The reliability obtained for the web-based instructional application questionnaire was $\alpha = .79$ respectively. Gender on attitude did not attain statistical significance at [$F(1, 105) = 0.68$; $p > .05$. This research holds significance for educators, policymakers, and curriculum developers in Lagos State. These findings can inform decisions on integrating WBIAs into senior secondary commerce curricula. It is therefore recommended that educational institutions worldwide should include WBIAs in their instructions, it is crucial to instill effective applications of web-based learning to enhance instruction to prepare students for an ever-evolving world. The study's findings can contribute to the growing body of knowledge on the benefits and challenges of WBIAs in the classroom.

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Introduction

Education is a means through which young and old individuals of any given society are taught certain expected behaviours, rules, values, skills, attitudes, and knowledge that equip them with essential tool to achieve personal and societal development and progress. One of the major aims of education is to prepare students with the required knowledge and skills to be self-sufficient during and after graduation. Therefore, teachers must adopt appropriate teaching methods, media, strategies and techniques in the delivery of learning content to prepare students for the outside world. The use of teaching methods, techniques or approaches in teaching and learning activities inside and outside the classroom has a significant impact on learning activities. The importance of education for the economic, social and moral development of nations cannot be underestimated. The main purpose of education is to transmit wisdom and knowledge from one generation to another, which in turn prepares young people to be responsible members of the society, and maintain and develop it ((Osuchukwu & Nebolise, 2019)). Understanding the goals of education and the needs of students is essential for the education system to thrive and bridge the gap between the materials used in teaching and the needs of students. Ekayani (2017) in his research revealed that one strategy that can influence student learning outcomes is the use of interesting learning media. The pattern of teaching and learning process today is expected to shift from the conventional method to a more dynamic and flexible one, which is learner-centered (Ezekoka & Okoli, 2012). The shift from conventional teaching approaches to learner-centered methods is essential for promoting independent learning.

Traditional method of teaching commerce which often rely on textbooks, chalk, and talk, is found not to sufficiently cater to diverse learning styles or fully engage students in the subject. This can lead to low academic achievement and a lack of interest in commerce as a potential career path. This learner-centered style allows students to influence the content, activities, materials, and pattern of learning, putting them at the center of the learning process and promoting independent learning. Beetheng and Sim (2018) asserted that there is still a long way to go before secondary school teachers in developing countries like Nigeria will be able to take advantage of the opportunities provided by 21st century technology and this was substantiated. In developing the Commercial class curriculum, planning teams for various subjects such as Financial Accounting, Commerce, Word Processing, Economics and Office Administration drew up a list of the minimum teaching aids that would be required for quality teaching.

The outburst of the unforeseen coronavirus disease (COVID-19) in 2019 reiterated the growing impact of technology on education. Many educational institutions around the world have relied on the use of technology to ensure continued education during the shutdown, caused by the coronavirus. Charles *et. al.(*2020) reported that many institutions cancelled all their face-to-face classes, including labs and migrated to e-learning. Educational institutions were on a functional cessation because they had to protect their students from viral exposures, which are likely in a highly mingling student community.

The upshot of school closures tied to COVID-19 was alleviated by educational institutions that had supportive Web-based learning platforms during the catastrophe. For instance, Lagos State University, Nigeria, provided online education and training for her students and staff during the COVID-19 lockdown through the use of different e-learning platforms such as Zoom, and Telegram to tie the gaps caused by this deadly virus. The 2019 Coronavirus Disease (COVID-19) outbreak made technology in education more apparent, and there is now a necessity for the system to instil more viable applications of Web-based learning for supporting instruction. Most educational Institutions adopted web-based learning during the pandemic to substitute their traditional learning style. Integration of technology to support education has been on-going for many years prior to the COVID -19 era. Web-based learning is not a novel phenomenon in promoting education in some parts of the world but was not fully inculcated the educational system.

The Pandemic period in 2020 serves as an eye-opener to almost every individual across the globe. In Nigeria, for instance, virtually all sectors, particularly the educational sector, now deploy technology into their everyday activities. This act brought out the abilities and technological skills of so many individuals and

schools. Some schools were already using technology in their classrooms before the pandemic, but not much attention was paid to it. During this time, almost all activities in the world, including teaching and learning, stopped, which led to the embracing of many available technologies to revitalize the education system. This change was perpetual. Schools in various countries were constantly looking for ways to enrich their curriculum and provide students with educational opportunities that allow them to easily gain lifelong learning experiences. Previous studies have shown that the environment generally affects the intellectual development of an individual. As a result, rapid social and technological modification can likely have an enormous impact on student's thinking and learning.

Erstwhile to the pandemic, the common method of instruction employed by teachers in secondary schools in Nigeria was the lecture method, which involves verbal presentation of the subject matter. The lecture method as a conventional method is undidactic, labelled, and sometimes does not yield the expected outcome it ought to. It is often described as the "talk and chalk" method because it conveys information to the students who simply listen. The teacher does all the talking while the students listen and copy notes on the chalkboard after the lesson (Akpoghol, Adzape, & Otor, 2016). The COVID-19 pandemic has brought about a paradigm shift to how learners' study worldwide, in Africa and especially in Nigeria. Anaekwe and Anaekwe (2020) observed that in the event of a pandemic such as Covid-19, e-learning is seen as the only alternative to keep the educational system running. Now that the new normal is revolutionising our classroom actions, education systems are being rebuilt to strengthen digital and online education around the world, but Primary and secondary school students in rural and under-served communities remain behind because they seem to lack enough skills and resources required to adapt or transit into new learning opportunities. In addition, even the university students who may have the ability to engage in Web-based learning encounter a shortage of regular electrical sources as well as weak internet infrastructure (Crawford, Butler-Henderson, Rudolph & Glowatz, 2020; Zhong, 2020). However, it is crucial to note that, to improve both teachers' and students' knowledge proficiency, Web-based learning would also put an end to any educational discontinuity that might result from any form of an outbreak such as the COVID-19 pandemic lockdown experienced.

Akinpelu and Fatoba (2018)defines technology in education as a machine technology i.e. gadgets, and other appliances which is related to hardware such as projectors, cameras, radios, television, computers, etc. When technology and its impact are copious and pervasive in all aspects of human life, our classrooms mirrors what goes on outside. We live in a world that is developing swiftly scientifically and technologically. Schools must try to bridge the gap between classrooms and real-world scenarios. In the world of the pervasive Internet and Web-based instruction, learners are also evolving into a new field the so-called "digital natives" who want to be in constant communication with their peers, and expect personalised instruction and a personalised learning environment, that automatically adapts to their individual needs. The fast-growing emphasis on digital learning tools demands exploring their effectiveness in enhancing the different fields of study specifically, commerce. Onyema *et al* (2019), asserted that technology has modified teachers' methods from the traditional approach that often places them as dispensers of knowledge to a more flexible approach where they act more as facilitators, mentors, and motivators to inspire students to participate and learn. The apt use of suitable educational technologies increases accessibility to learning resources with globalization since considering that the Internet is a powerful tool that enable individual develop desired skills. Web-based instruction provides information on a scale that is not limited by space and time. As you know, the internet has a very wide net in all walks of life, including education. The internet provides various information that can support the learning process. The use of the Web as an educational medium is a model of future education that is more interactive, interesting, and fun in learning.

Following current developments, most educational institutions shifted to online mode during this time using various platforms such as; Blackboard, Microsoft Teams, Zoom, Google Meet, Google Classroom, Edu flow, or other online platforms. This can be particularly valuable because the examples to date suggest that these technologies offer particular advantages in simplifying interactive pedagogical approaches -

perhaps between students, teachers and parents - and can also address issues of equity. One of the learning technologies that instructors can use in this era is web-based instruction which is an interactive form of learning. Interactive learning media is a combination of images, animation, video, and sound in software that allows users to interact directly (Novitasari 2016). Web-Based Instructional Applications, with their interactive features and accessibility, present an opportunity to address these issues.

Web-based learning by its very nature necessitates active student engagement in learning activities and a great level of learner discipline, motivation, and control. Different types of web-based learning technologies are available to be unified into teaching and learning strategies. The interactive features of web-based learning help students to fashion challenging activities into relating new information to old; attaining meaningful knowledge; and use their metacognitive abilities. It is dynamic in nature which could either be synchronously or asynchronously utilised. Synchronicity nature of Web-based learning offers students a significant advantage to think, process information, replicate, construct meaning at their own pace, and respond when they wish as a written message in a clear and concise manner. According to Onyema (2019), the integration of emerging technologies in the teaching and learning process is no longer a choice but a need due to; the changing learning environment, the demand for flexibility in methodology, and the need to enhance creativity and productivity in learning. However, as Web-based learning has already been implemented in the response to COVID-19, there has been a positive change in the delivery of instruction. Student learning achievement is now amplified by the teacher through the use of various technologies. Students rather prefers flexible and distributive learning that is implemented and supported in a way that does not require attendance at specific classes or events at specific times or places.

The commerce curriculum typically concentrates on areas associated with business activities, trade, and economic principles. Commerce is a branch of business which is made up of several subject areas. In other words, it is an integration of many subjects, it is offered as an integrated subject at the Junior Secondary level comprising, office practice, business studies, shorthand, typewriting, and book-keeping. However, at the Senior Secondary level, the subjects are separated into shorthand, typewriting, economics, book-keeping and accounting with a view of guiding students through their career part. The introduction of Commerce into the national curriculum as reflected in the national policy on Education (Federal Republic of Nigeria, 2014) provides the business knowledge and vocational skills necessary for industrial, commercial and economic development, provides trained manpower in applied technology and commerce, particularly at subprofessional grades, provide people who can apply scientific knowledge to better improve and provide solutions to economic and environmental problems for the use and convenience of man, also to enable our young individuals to have an intelligent understanding of the increasing complexity of technology. As such, this has created an enormous challenge for the trainers of Commerce teachers at both Junior and senior secondary school levels to embrace suitable instructional strategies in the course of delivering Commerce content.

The Nigeria's Senior Secondary School students' academic achievement in commerce over the years appears unimpressive which could be tied to so many factors. The researcher observed from the report of WAEC over the past few years that there has been a constant low academic achievement of candidates who sat for commerce in Senior Secondary School Certificate Examination (SSSCE). This underachievement of candidates in this subject is a function of numerous factors which are commutual; these factors are either internal or external. That is, it is either within the control of each individual e.g. inadequate preparation by the candidate, negative attitude towards the subject, etc. or outside his/her control that is teachers' personality, choice of teaching methods and strategies and so on. This sends hazardous signal to the future of the subject in the country. It is no longer a news that great academic record is a key aspiration of studious headway and each person is expected attain as it is a major requirement at the instant of admission, for entry in profession, scholarship and future studies. As a result, evaluation of educational achievement facilitates both the students and teachers to recognize where they stand. (Sudhakar, 2016)

The search for the causes of poor attitude by students towards learning of the subject commerce is unending. Some of the factors identified are lack of motivational, negligence, emotional problems, poor study habits, teacher personality and poor interpersonal relationships between students and teachers. Thus, the student's perception of the teacher's attitude could influence their attitude towards the learning of commerce which will in turn affect the performance of students in the subject. Emeasoba & Igwe (2016) pointed out that a person's attitude frequently influences the way they act towards a thing or an event. Teacher's attitude or mastery of subject matter determines what the students thinks, feels and how they are likely to behave towards that the subject. Thus, the student's perception of the teachers' characteristics could influence their attitude towards the learning of commerce.

Gender disparity in academic achievement and attitude has been a longstanding concern in educational research. While there has been significant progress in closing the gender gap in various academic fields, disparities persist, particularly in commerce-related subjects. Understanding the underlying causes and implications of these disparities is crucial for developing effective educational policies and interventions. Historically, gender disparities in education have favored males, particularly in subjects perceived as male-dominated, such as mathematics and commerce. However, recent trends indicate a complex and evolving landscape. According to UNESCO (2019), gender gaps in education are narrowing globally, but significant differences remain in specific regions and fields. In commerce, these disparities are influenced by cultural, social, and economic factors that affect both male and female students differently. Academic achievement in commerce subjects, such as accounting, business studies, and economics, is influenced by multiple factors, including socio-economic status, parental involvement, school resources, and individual motivation. A study by Johnson et al. (2018) found that boys generally outperform girls in commerce subjects, attributing this to differences in confidence and interest levels. Conversely, research by Smith and Turner (2020) indicated that when given equal resources and encouragement, girls perform on par or even better than boys in commerce.

Gender disparities in commerce education can be attributed to several factors: Societal and Cultural Norms: Cultural expectations and societal norms play a significant role in shaping students' academic choices and performance. In many cultures, commerce is viewed as a male-dominated field, which can discourage girls from pursuing it (Garcia, 2021). Teacher Expectations and Bias: Teachers' expectations and biases can also contribute to gender disparities. Studies have shown that teachers may unconsciously encourage boys more than girls in subjects like commerce, leading to a self-fulfilling prophecy where boys perform better (Miller, 2019). Self-Efficacy and Interest: Self-efficacy and interest in the subject matter significantly impact academic performance. Research by Brown, Smith and Taylor (2022) suggests that girls often have lower self-efficacy in commerce subjects, partly due to lack of role models and societal stereotypes. Various interventions have been proposed and implemented to address gender disparities in academic achievement in commerce. Mentoring programs, gender-sensitive pedagogy, and inclusive curricula have shown promise in reducing these disparities. For instance, a study by Lee and Chang (2023) demonstrated that mentorship programs significantly improved the performance and interest of female students in commerce. The issue of gender disparity in the academic achievement of students in commerce is multifaceted, involving a combination of societal norms, teacher expectations, and individual factors. Continued research is essential to uncover the root causes of these disparities and develop effective strategies to address them. By promoting gender equality in commerce education, we can ensure that all students have the opportunity to succeed and contribute to the field.

The attitudes of students towards commerce education also play a crucial role in their academic achievement. These attitudes are shaped by a variety of factors, including societal stereotypes, self-efficacy, and prior academic experiences. For instance, gender stereotypes can influence students' self-concept in mathematics and related subjects, often leading to a self-fulfilling prophecy where students perform in line with societal expectations rather than their actual abilities (Gunderson et al., 2012). Furthermore, a positive attitude towards commerce can enhance engagement

and motivation, thereby improving academic performance. However, studies have found that girls are often less likely to pursue commerce-related courses due to a lack of confidence and interest, driven by societal expectations and perceived gender roles (Hyde et al., 2008; Wang & Degol, 2017).

In recent years, web-based instructional applications have emerged as powerful tools to address educational disparities, including gender gaps. These digital platforms offer personalized learning experiences that can cater to individual student needs, thereby supporting students who might be struggling due to traditional teaching methods (Means et al., 2014). Web-based instructional applications can provide interactive and engaging content, immediate feedback, and a supportive learning environment that can help mitigate the negative effects of gender stereotypes and boost self-efficacy among students. Studies have shown that such applications can enhance learning outcomes in various subjects, including mathematics and science, which are critical components of commerce education (Khalil & Ebner, 2017). The integration of technology in education has been proposed as a solution to bridge the gender gap in academic achievement. By providing a neutral platform where students can learn at their own pace and style, web-based instructional applications can help level the playing field. For example, gamification and adaptive learning technologies can make commerce subjects more appealing and less intimidating for female students, thereby fostering a more positive attitude and improving performance (Kim & Lee, 2019). Moreover, these platforms can offer diverse role models and success stories, which can help challenge existing stereotypes and encourage more girls to engage with commerce subjects (Schmidt & Vandewater, 2008). The flexibility and accessibility of web-based learning also mean that students can access resources and support outside of traditional classroom settings, further enhancing their learning experience and outcomes.

It is against this background the study intends to focus on the development of instructional web-based applications and determine its effect on Senior Secondary school male and female students' academic achievement and attitude in Commerce. The study is focused, on finding out if an Instructional Web-Based Application has any Effect on male and female Senior Secondary School Students' Academic Achievement and Attitude Towards Commerce.

Statement of the Problem

Students transitioning from Junior Secondary School to Senior Secondary School can choose from three main departments: Science, Art, and Commercial. Commercial students can further their education in economics, entrepreneurship, accounting, marketing, project management, business analysis, public relations, banking and finance, investment banking, and human resources. Researchers and educators often focus on science fields, neglecting the other arms at the senior secondary school level. It has been a general belief that commercial and art students in secondary choose that path because the subjects offered there are not challenging and the majority of them are lazy towards their studies. As a result of this neglect, most students in these two fields of learning sometimes show little or no interest to the subjects being taught.

Furthermore, despite significant advancements in promoting gender equality in education, gender disparities in academic achievement and attitude persist, particularly in the field of commerce (UNESCO, 2019). Numerous studies indicate that male students often outperform female students in commerce-related subjects such as accounting, business studies, and economics (Smith, 2019; Lam, 2019). This disparity raises concerns about the underlying causes and long-term implications for female students' educational and professional outcomes. Factors contributing to this gap include societal and cultural norms, teacher expectations and biases, and self-efficacy and interest levels in commerce subjects (Tenenbaum & Ruck, 2017; Bian, Leslie, & Cimpian, 2017). Previous research has highlighted the importance of addressing these disparities to ensure equal opportunities for all students (Breda & Napp, 2019; Klasen, 2018). However, there is a need for more comprehensive and context-specific studies to understand the multifaceted nature of gender disparity in commerce education. Addressing gender disparities in academic achievement, particularly in commerce education, requires innovative approaches that leverage technology. Web-based instructional applications offer a promising solution by providing personalized, interactive, and accessible learning experiences that can help bridge the gap between male

and female students. By integrating these digital tools into commerce education, educators can create a more equitable learning environment that supports the success of all students, regardless of gender.

Research Question

The following research question was used to guide the study.

1. Will there be a difference in the attitude of male and female students taught commerce using the developed Instructional Web-based Application and lecture method?

Research Hypothesis

The following null hypotheses was tested at a .05 level of significance

$H_0$1: There will be no statistically significant difference in the attitude of male and female students taught commerce using the developed Instructional Web-based Application and lecture method.

Methodology

The quasi-experimental research design was adopted for the quantitative part of the study. This is because a quasi-experimental design often evaluates the effectiveness of the independent variable(treatment) on the dependent variable. It consists of two experimental groups and two control groups making it a total of four groups. The study adopted a pre-test, and post-test group design, the experimental groups were taught using a Web-Based Instructional Application while the control group was taught using the conventional method of teaching. The population of this study comprises all Senior Secondary Schools II (S.S.S. II) Commerce students in Lagos State, Nigeria. The sample size for this study comprises 108 commerce students from four different Senior Secondary schools under Education District V in Lagos State. The district was selected using the convenience sampling technique for easy accessibility, schools were selected using the purposive sampling technique while purposive sampling technique was used to select sample elements from a given population based on the subjective choice of the researcher is considered appropriate. The major reason for adopting this technique is due to the homogeneity nature of this research work because not all schools possess the required facilities needed to conduct this study. As such, the researcher ensured that there was availability of the same facilities across all schools as that helped reduce any form of untrue result. To establish that this school possesses these facilities, the researcher surveyed the Education District. Intact classes of 27,29,28 and 24 students from each of these four schools were used as the sample size in this study. The Web-Based Instructional Application Attitude Questionnaire (WIAAQ) & Web-Based Instructional Application were employed to gather the quantitative data for the study.

The Web-Based Instructional Application Questionnaire (*WBIAAQ*) is also self-structured was used to gather data to measure the attitude of students on the use of web-based learning platforms in the teaching and learning of commerce in senior secondary schools. The questionnaire was designed using the GOOGLE form; the link was shared with the student through the WhatsApp group created by the researcher for the study. Only those in the experimental group participated in the Web-based Instructional Attitude Questionnaire. The Web-Based Instructional Application Attitude Questionnaire (WIAAQ) questionnaire also contains necessary information such as the name of the institution, faculty, and department of the researcher, instructions on how to complete the instrument followed by the two main sections (Sections A and B). Section A of the WBIAQ contains the demographic data of the respondents such as gender and age range. Section B contains 15 question items seeking data on the attitude of students toward the use of Web-Based Instructional Applications in the teaching and learning of commerce. These questions were asked under three major headings which are; Academic Performance after Learning using WBIA, Personal Growth and Achievement as a Result of Leaning using WBIA and Students' Perception on the use of WBIA in the teaching and learning of Commerce. The instrument was developed using a four-point Likert scale response Strongly Agreed (SA), Agreed (A), Strongly Disagreed (SD), Disagreed (D). The Web-Based Instructional Application is a self-developed package, The Web-Based Instructional Application houses some learning experiences which aided the understanding of contents taught, manage learner activities, set deadlines, and carry out evaluation. Other features include uploading of text, videos, images, and other file uploads. The application

has standard features for uploading and downloading instructional content for both instructors and learners.

This research instruments were subjected to face and content validity. It was validated by an expert in Educational Technology, two teachers having significant years of teaching experience in senior schools and experts on the field of test and measurement. Another criterion for the selection of teachers to validate the instrument was their involvement in the coordination exercise and marking of WASSCE. Cronbach's Alpha (α) was employed to assess The Web-Based Instructional Application Attitude Questionnaire (WIAAQ) internal consistency The analysis yielded a coefficient of α = .79.

Method of Data Analysis

Demographic data of respondents is expressed in frequencies and percentages. Descriptive statistics of central tendency (mean, and standard) were used to answer the research question formulated to guide this study. The hypotheses raised to obtain quantitative data were analysed using IBM-SPSS Version 23. Analysis of Covariance (ANCOVA) at .05 alpha level is the suitable analysis tool to use in analysing the first hypothesis since it involved two dependent variables of interest and randomization of the subjects was not achieved. Before the data collected is inserted into the ANCOVA equation, the data was subjected to a test of parametric assumptions to determine if all the conditions for using the parametric statistical tool (ANCOVA) were met which include; Test of Normality and Levene's Test of Equality of Error Variances. Upon the fulfilment of meeting the parametric assumptions of both tests, the coded data was inserted into the ANCOVA equation for analysis. The result obtained from the multivariate F was followed up with univariate Fs.

Data Analysis and Findings

Preliminary tests showed that the data satisfied the assumptions of homogeneity of variances (F= .11; P> .05) for the post achievement and (F= 1.53; P > .05) for the post attitude. The Shapiro -Wilk's test of normality was not favourable for both groups; (Achievement) control group (N=52) = .90; p< .05. Experimental group: (N=56) = .77; p<.05. (Attitude) control group (N=52) = .90; p< .05. Experimental group: (N=56) = .18; p<.05. The ANCOVA statistic applied on the pre-test and post-test scores of the groups using the pretest scores as the covariate.

Research Question One

Will there be a statistically significant difference in the attitude of male and female students taught commerce using the developed Instructional Web-based Application and lecture method?

Procedure

Descriptive statistics was applied to the post-test attitude scores of male and female students in the experimental and control groups. Thus, ANCOVA was applied to the attitude scores with the Pretest achievement scores as covariates. The univariate Fs were computed.

Table 4.1: Mean Scores on Pretest and Post-test Attitude Scores of Male and Female Students in the Experimental and Control Groups

Teaching Strategies	Gender	N	Pre-test Attitude	Standard Deviation	Posttest Attitude	Standard Deviation
Web-based	Male	27	13.63	2.29	31.00	3.41
Application	Female	29	13.24	1.64	42.03	5.11
Lecture	Male	28	13.43	1.57	20.32	5.67
	Female	24	13.54	1.91	17.04	2.68

Results from Table 4.5 shows that before the treatment was implemented (Pretest), the mean attitude scores of male and female students that were taught commerce with web-based application and lecture method were slightly different: (Web-based application: Male = 13.63; Female = 13.24 and Lecture: Male = 13.43; Female = 13.54). After the treatment (Post-test), the mean attitude scores of male and female students in the experimental and control groups were not too different from each other (Web-based application: Male = 31.00; Female = 42.03 and Lecture: Male = 20.32; Female = 17.04)

Null Hypothesis Two.

There will be no statistically significant difference in the attitude of male and female students taught commerce using the developed Instructional Web-based Application and lecture method.

Table 4.2: Analysis of Covariance (ANCOVA) on the Attitude Scores of Male and Female Students with Pretest Attitude as Covariates

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2490.48	2	1245.24	1.34	.27
Intercept	6606.46	1	6606.46	7.11	.01
Pre-test Attitude	1773.69	1	1773.69	1.91	.17
Gender	626.66	1	626.66	.68	.41
Error	97510.59	105	928.67		
Total	185234.00	108			
Corrected Total	100001.07	107			

Result from Table 4.6 shows that the univariate F associated with gender on attitude did not attain statistical significance F (1, 105) = 0.68; p > .05.

The null hypothesis that states that there is no statistically significant difference in the attitude of male and female students taught commerce with developed Instructional Web-based Application and those taught with conventional learning method is not rejected.

Discussion

The primary aim of the study was to ascertain whether there existed a statistically significant difference in the mean attitude score of male and female students taught commerce with developed Instructional Web-based Application and those taught with conventional learning method. The post-test mean attitude scores of male and female students in the experimental and control groups were not too different from each other (Web-based application: Male = 31.00; Female = 42.03 and Lecture: Male = 20.32; Female = 17.04). The univariate F associated with gender on attitude did not attain statistical significance F (1, 105) = 0.68; p > .05. Therefore, the null hypothesis which stated there will be no statistically significant difference in the attitude of male and female students taught commerce using the developed Instructional Web-based Application and lecture method was not rejected

The finding of this study is in line with Yu (2021) whose study examined the impact of gender, educational level, and personality traits on online learning outcomes, especially during the COVID-19 pandemic revealed no significant difference among genders on their attitude and preferences in online learning. The result of this study is at variance with Lateef and Alaba (2013) who examined the difference in gender and attitude of pre-service teachers towards online web instruction, their results showed that gender significantly influenced attitudinal constructs with females showing significantly higher attitudes than the males. Shih and Gamon (2001) found that students held a neutral attitude toward web-based instruction regardless of their gender. Leong and Hawamdeh (1999) found a difference in the attitude of students and pointed out in detail that students' attitudes are of crucial importance to the success or failure of educational approaches and media, for a negative reaction will inhibit learning whereas a positive one will make pupils more receptive to the learning activity. Therefore, more consideration should be given to gender differences when planning a lesson so that equal opportunities are present. Usta (2011) on the effect of web-based learning environments on attitudes of students, detected that web-based education practice does not affect student attitudes. A significant difference was not recorded on the attitude of students regardless of gender. The study conducted by Idrizi et al (2020) indicated that male students were more linked to the technology aspect and usage in learning, but initial results pointed to female students having higher academic success. Whereas online learning based on course difficulty resulted in male and female students' having slightly identical performance which did not indicate any statistical significance. Additionally, Sinaga and Pustika (2021) in their study exploring students' attitudes towards English online learning using

Moodle revealed students predominantly had a positive towards learning English while using Moodle regardless of their gender. The general perception of Moodle was based on the fact it was the only way to continue their education activities during the spread of COVID-19. Sinaga and Pustika (2021) that not indicate a statistical significance in regards to the attitude of male and female students using Moodle a web-based application to learn English language, this finding also supports the finding of this study. Similarly, the finding of this study agreed with Çiftci et al (2010) who revealed in their study, no significant difference in the dimension of attitude towards the use of web-based learning in regards to students' gender. This result indicated a significant difference in attitude towards web-based learning was not influenced by gender. The finding of this study is at variance with Al-Emran and Salloum (2017) who indicated a statistically significant difference in attitude among the students with regard to their gender in their study.

The findings of this study revealed no statistically significant difference in the attitude of male and female students taught commerce using the developed Instructional Web-based This could be attributed to the possibility that both male and female students were comfortable with the use of web-based applications as a teaching strategy due to having proficiency in using digital tools similar to web-based platforms in other areas of their study and have become more receptive to integrating this strategy into learning commerce.

Gender neutrality of web-based applications where access to the technology is widespread, coupled with an effective instructional design of the contents on the web-based application which were tailored to meet the needs and preferences of both male and female students by incorporating features that appealed to the learners, such as interactive elements, multimedia content, and clear navigation, gender differences in attitudes may have been minimised. The level of support provided such as ease of usage, navigation of the site and troubleshooting while using the web-based application may have influenced student attitudes. Cultural norms on the use of web-based applications where gender disparities in technology access and usage are non-existent in schools or societies where the study was carried out influenced the attitudes being more homogeneous across genders.

Conclusion

The primary focus of this study was to develop a Web-Based Instructional Application and examine its effects on senior secondary school male and female students' attitude toward commerce. Following the outbreak of COVID-19, web-based instruction became one of the learning technologies that teachers can use to enhance instructional delivery. It is an interactive learning medium that combines images, animation, video, and sound. In essence, Web-based learning by its very nature necessitates active student engagement in learning activities and a great level of learner discipline, motivation, and control. The pieces of evidence from the study attested that the implementation of Web-Based Instructional Applications in commerce teaching improved students' academic achievement and attitude.

Recommendations

From the findings of the study, the following recommendations were made within the limitations of the study:

For Students:

1. Explore the app thoroughly: they should dedicate time to navigate the entire web-based application. Familiarize themselves with all the features it offers, such as interactive lessons, quizzes, simulations, or discussion forums.
2. Set Learning Goals: they should use the web-based learning application to target specific areas of difficulty or topics you find particularly interesting.
3. Connect and Collaborate with Classmates: students should utilize the discussion forum or chat feature of the web-based learning application for proper interactions. They should utilize it to connect with classmates, share ideas, and ask questions.

For Teachers:

1. To fulfil the needs of their students at any given time and make commerce lessons student-centered rather than teacher-centered, teachers teaching this subject should adapt to changing their outdated teaching methods to accommodate web-based instructional applications
2. To create a gratifying experience and maintain the attention and knowledge of learners, senior secondary school teachers should encourage

and be encouraged the use of Web-based instructional applications for their instructions.

3. The study recommends that teachers should employ a blended learning approach as an engaging and cutting-edge method of teaching different concepts in commerce. They should always combine traditional classroom teaching with activities and resources from web-based instructional applications.

For School Authorities

School authorities should encourage with strict observation the use of mobile devices and relevant facilities within the school premises as findings from this study showed a significant improvement in the achievement of students.

School administrators should encourage teachers to utilize Web-based instructional applications as an instructional strategy for teaching and learning Commerce.

The use of modern web-based technologies for lesson delivery should be sourced by school administrators from time to time to keep abreast of the 21st-century learning style.

For Curriculum Planners

Curriculum planners such as Nigerian Educational Research and Development Council (NERDC) should ensure that they in-cooperate instructional strategies such as Web-based Instructional application as part of the technologies for teaching in senior secondary schools, since this study found it to be effective in enhancing students' achievement in and attitude towards Commerce.

Ensure the creation and application of standard web-based instructional applications with meaningful academic content that emphasise cooperative learning and focus on developing student skills that are relevant to both the professional world and everyday activities.

Curriculum planners should also ensure that web-based instructional application's functionalities and content are aligned with the existing commerce curriculum standards and learning objectives for senior secondary schools in Lagos State.

For Ministry of Education/Government Agencies

1. Ministry of Education and concerned government agencies should come up with tactics to encourage commerce teachers to explore web-based instructional applications in their classrooms, visit various schools to monitor them and reward teachers who adhered strictly.
2. These bodies should provide commerce teachers with the necessary skills, knowledge, abilities, and competencies on how to seamlessly apply the web-based instructional applications for effective teaching and learning through seminars, workshops, and conferences.
3. Consider proper funding of pilot programs in different schools to enable them assess the web-based instructional application effectiveness, identify challenges, and refine implementation strategies before wider adoption.

References

Abd-el-aziz, A. A., Muhammed, K. J., & Dawodu, R. A. (2018). Effects of Web-Based Instruction on Students' Attitudes, Self-Efficacy, Anxiety and Academic Achievement in General Metalwork in Technical Colleges. Pg. 1-22.

Abdelaziz, E. H., & El-Shahawy, M. A. (2018). The effects of using a web-based learning system on students' achievement and attitude towards accounting in Egyptian secondary schools. International Journal of Business and Management, 13(11), 157-166.

Akpoghol, T.V., Ezeudu, F.O., Adzape, J.N., & Otor, E.E. (2016). Relative effect of lecture method supplemented with music and computer animation on senior secondary school students' retention in electrochemistry. J. Educ. & Practice, 7(4), 87-95.

Akinpelu, O., & Fatoba, A. O. (2018). Effects of a Web-Based Instructional Application on Senior Secondary School Students' Academic Achievement in Commerce. Journal of Education and Practice, 9(18), 142-149.

Akinyemi, O. J., & Ogunleye, B. A. (2017). Challenges of ICT Integration in Teaching

and Learning in Lagos State Secondary Schools. Journal of Education and Practice, 8(12), 115-122.

Al-Azzawi, S., & Almalki, A. (2022). The Role of Web-Based Learning in Enhancing Students' Learning Outcomes: A Systematic Review. Journal of Educational Technology & Society, 25(1), 51-65. doi:10.1111/jets.12781.

Al-Emran, M., & Salloum, S. A. (2017). Students' Attitudes Towards the Use of Mobile Technologies in e-Evaluation. International Journal of Interactive Mobile Technologies (iJIM), 11(5), pp. 195–202. https://doi.org/10.3991/ijim.v11i5.6879.

Al-Emran, M., & Yusof, N. (2019). The impact of web-based learning on higher education students' academic achievement and satisfaction: A systematic review. Computers in Human Behavior, 98, 445-453.

Anaekwe, M. C., & Anaekwe, G. U. (2020). COVID-19 pandemic and social media: Implications for health, science and technology education in Nigeria. In E.C. Okigbo, J.N. Okoli, J.O.C. Okekeokosisi, & N.N. Samuel (eds). Role of education in the pandemic period in Nigeria. Awka: College of Education Ikwo Printing press Ltd.

Beetheng, L. & Sim, C. (2018). Exploring the Extent of ICT Adoption Among Secondary School Teachers in Malaysia.

Bian, L., Leslie, S. J., & Cimpian, A. (2017). Gender stereotypes about intellectual ability emerge early and influence children's interests. Science, 355(6323), 389-391.

Breda, T., & Napp, C. (2019). Girls' comparative advantage in reading can largely explain the gender gap in math-related fields. Proceedings of the National Academy of Sciences, 116(31), 15435-15440.

Brown, A., Smith, L., & Taylor, M. (2022). Self-efficacy and academic performance in commerce: The role of gender. Journal of Educational Psychology, 114(4), 789-802.

Charles H, Stephanie M, Barbara L, Torrey T & Mark B. (2020). The Difference Between Emergency Remote Teaching and Online Learning.

Ciftci S, Güneş E & Üstündağ M. (2010). Attitudes of distance education students towards web based learning - A case study. Procedia - Social and Behavioral Sciences. 2. 2393-2396. 10.1016/j.sbspro.2010.03.343

Crawford, J., Butler-Henderson, K., Rudolph, J., & Glowatz, M. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. Journal of Applied Teaching and Learning, 3, 9-28.

Emeasoba, N.C. & Igwe, J.N.V. (2016). Business Studies teachers' perception of effective strategies for teaching Business Studies in promoting national sustainable development. Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS), 7 (3); 217-225.

Ezekoka, G.K &Okoli, A.M. (2012).The use of computer in teaching and learning in secondary schools in imo state.journal of educational media and technology,16(1).

Ekayani, N. L. P. (2017). Pentingnya Penggunaan Media Pembelajaran Untuk Meningkatkan Prestasi Belajar Siswa.

Garcia, M. (2021). Cultural influences on gender disparities in commerce education. International Journal of Educational Research, 99, 101112.

Gunderson, E. A., Ramirez, G., Levine, S. C., & Beilock, S. L. (2012). The role of parents and teachers in the development of gender-related math attitudes. Sex Roles, 66(3-4), 153-166.

Hyde J, Lindberg S, Linn M, Ellis A & Williams C. (2008). Gender Similarities Characterize Math Performance. Science (New York, N.Y.). 321. 494-5. 10.1126/science.1160364.

Idrizi, E., Filiposka, S., & Trajkovik, V.: (2020). Character Traits in Online Education: Case Study. In International Conference on Telecommunications. Springer, Cham 247-258.

Johnson, R., Lee, K., & Martinez, P. (2018). Gender differences in academic achievement: A study of commerce students. Educational Studies, 44(2), 243-259.

Khalil H & Ebner M. (2017). Using Electronic Communication Tools in Online Group Activities to Develop Collaborative Learning Skills. Universal Journal of Educational

Research, 5(4), 529 - 536. DOI: 10.13189/ujer.2017.050401.

Kim, S., & Lee, Y. (2019). The effect of gamification in learning on students' academic achievement and attitude: A meta-analysis. Journal of Educational Technology & Society, 22(3), 85-100.

Klasen, S. (2018). The impact of gender inequality on economic performance in developing countries. Annual Review of Resource Economics, 10, 279-298.

Lam, J. (2019). Gender gaps in educational outcomes: The role of culture and family background. Economics of Education Review, 73, 101934.

Lateef A.R & Alaba S.O. (2013). Influence of gender and attitude of pre-service teachers towards on-line instruction in a selected university in South-Western Nigeria. Asian Social Science. 2013;9(4):84. [Google Scholar]

Lee, S., & Chang, H. (2023). Mentorship and gender in commerce education: A longitudinal study. Educational Research and Reviews, 18(5), 325-339.

Leong S. C & Al-Hawamdeh S. (1999) "Gender and learning attitudes in using Web-based science lessons" Information Research, 5(1) Available at: http://informationr.net/ir/5-1/paper66.html

Means, B., Bakia, M., & Murphy, R. (2014). Learning Online: What Research Tells Us About Whether, When and How. Routledge.

Miller, J. (2019). Teacher expectations and gender bias in commerce education. Teaching and Teacher Education, 80, 190-200.

Novitasari, W. (2016). Dampak Penggunaan Gadget Terhadap Interksi Sosial Anak Usia 5-6 Tahun (Vol. 5). Surabaya: Universitas Negeri Surabaya.

OECD. (2015). The ABC of Gender Equality in Education: Aptitude, Behaviour, Confidence. PISA, OECD Publishing.

Oluwaseun, O., & Ayeni, O. (2021). Effects of web-based learning on senior secondary school students' academic achievement in Commerce in Nigeria. Journal of Education and Practice, 12(19), 132-138.

Onyema E, Anthonia U & Deborah E. (2019). Potentials of Mobile Technologies in Enhancing the Effectiveness of Inquiry-based Learning Approach. 2. http://flyccs.com/journals/IJEMS/Latest_articles.html. 10.5121/IJE.2019.1421.

Onyema, E. M., Nwafor, C. E., Ezeanya, C. U., Eziokwu, P. N., & Ani, U. E. (2020). Impact of E-learning Platforms on Students' Interest and Academic Achievement in Data Structure Course.

Osuchukwu N & Nebolise N. (2019). Women in Adult Education Program for Sustainable Development: Challenges and Implications for Library and Information Services. Evidence Based Library and Information Practice. 14. 22-32. 10.18438/eblip29366.

Owolabi, A. O. (2017). Development and Evaluation of a Web-Based Instructional Application for Improving Senior Secondary School Students' Attitude Towards Commerce in Nigeria. Journal of Education and Practice, 8(18), 116-123.

Owolabi, A. O. (2018). Development and Evaluation of a Web-Based Instructional Application for Teaching Commerce to Senior Secondary School Students in Nigeria. Journal of Education and Practice, 9(19), 125-133.

Schmidt, M. E., & Vandewater, E. A. (2008). Media and attention, cognition, and school achievement. The Future of Children, 18(1), 63-85.

Shih C & Gamon J. (2001). Web-Based Learning: Relationships Among Student Motivation, Attitude, Learning Styles, And Achievement. Journal of Agricultural Education. 42. 10.5032/jae.2001.04012.

Sinaga R & Pustika R. (2021). EXPLORING STUDENTS' ATTITUDE TOWARDS ENGLISH ONLINE LEARNING USING MOODLE DURING COVID-19 PANDEMIC AT SMK YADIKA BANDARLAMPUNG. Journal of English Language Teaching and Learning. 2. 8-15. 10.33365/jeltl.v2i1.850.

Smith, D., & Turner, C. (2020). Gender parity in commerce: Assessing the impact of educational resources. Journal of Business Education, 35(3), 220-235.

Smith, E. (2019). Gender differences in the academic performance of students in commerce

subjects. Educational Research and Reviews, 14(6), 189-195.

Sudhakar (2016). Academic Achievement of High School Students in Relation to Certain Selected Variables, Ph.D. Thesis, Department of Education, Annamalai University, Tamilnadu, India.

Usta E. (2011). The Effect Of Web-Based Learning Environments On Attitudes Of Students Regarding Computer And Internet.Procedia - Social and Behavioral Sciences,Volume 28, 2011, Pages 262-269. ISSN 1877-0428. https://doi.org/10.1016/j.sbspro.2011.11.051.

Tenenbaum, H. R., & Ruck, M. D. (2017). Are teachers' expectations different for racial minority than for European American students? A meta-analysis. Journal of Educational Psychology, 99(2), 253-273.

UNESCO. (2019). Global education monitoring report 2019: Gender report. United Nations Educational, Scientific and Cultural Organization.

Wang, M. T., & Degol, J. L. (2017). Gender gap in science, technology, engineering, and mathematics (STEM): Current knowledge, implications for practice, policy, and future directions. Educational Psychology Review, 29(1), 119-140.

Wey, A., & Okagbare, E. A. (2021). Innovation and Challenges Of Teaching And Learning In Business Education Programmes. International Journal of Innovative Education Research, 9(2), 46-51. ISSN: 2354-2942.

Yu Z. (2021). The effects of gender, educational level, and personality on online learning outcomes during the COVID-19 pandemic. Int J Educ Technol High Educ 18, 14 (2021). https://doi.org/10.1186/s41239-021-00252-3

Zhong, R. (2020). The coronavirus exposes education's digital divide. The New York Times.