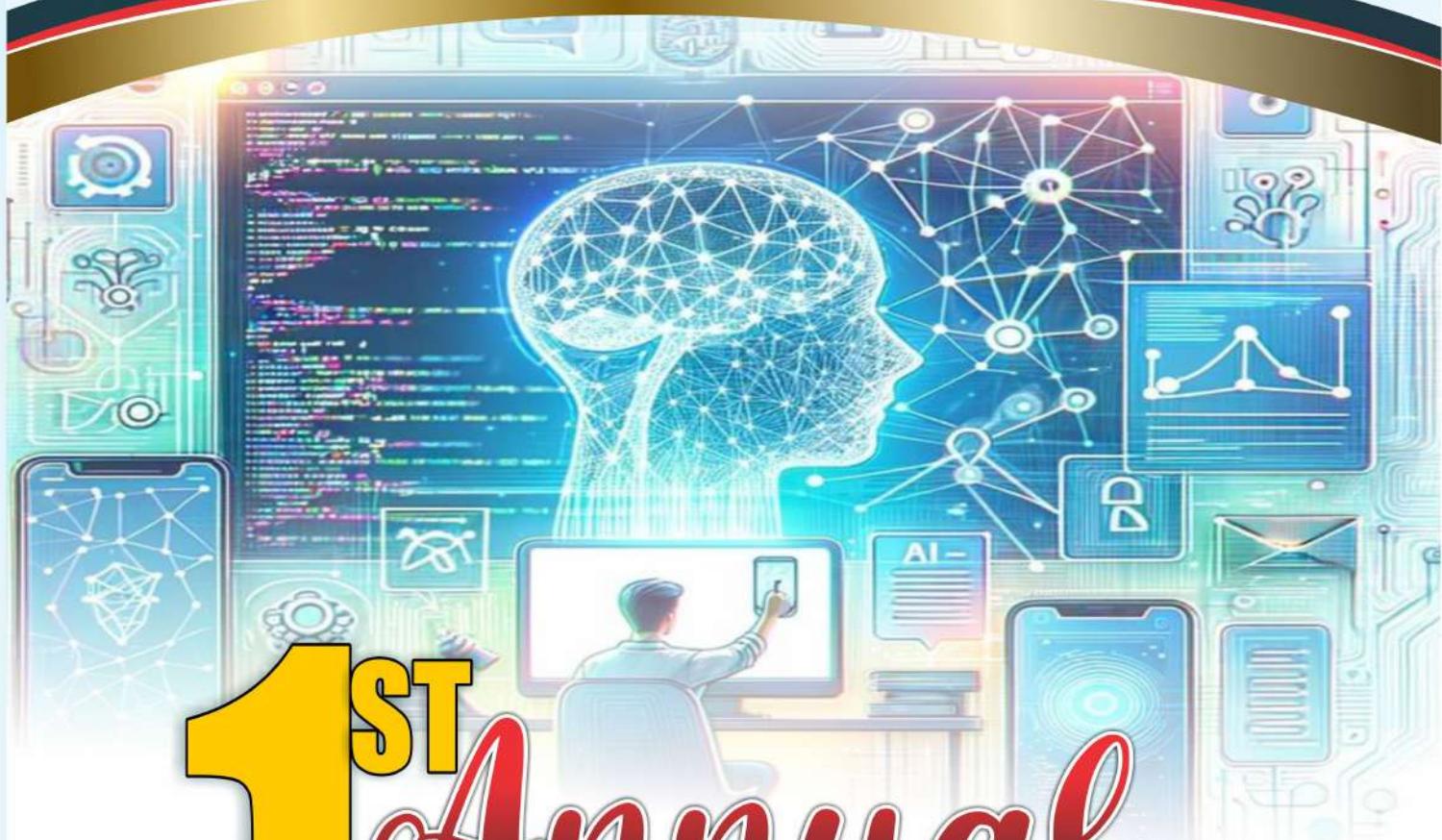




ASSOCIATION OF SCIENCE EDUCATORS ANAMBRA (ASEA)

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**SCIENCE EDUCATORS AND DIGITAL LITERACY
IN THE 21ST CENTURY**



1ST
Annual
CONFERENCE
PROCEEDINGS 2025

Editor
Prof. Josephine N. Okoli

ASSOCIATION OF SCIENCE EDUCATORS ANAMBRA (ASEA)

**THEME: SCIENCE EDUCATORS AND DIGITAL LITERACY IN THE 21ST
CENTURY**

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10- 12th July, 2025

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Anambra State, Nigeria

Usan Peter

Chemistry Department
Federal Technical College, Awka,
Anambra State, Nigeria

PROGRAMME OF EVENTS

- Opening Praying
- Chairman's Opening Remark
- Breaking of Kola nut
- Welcome Address by the acting President of the Association
- Keynote Presentation by Prof. Cecilia O. Ekwueme
- Lead Paper Presentation by Prof. Telima Adolphus
- About the Electronic Book / Unveiling of Book Chapter – E-Book launch
- Item 7
- Meritorious Award
- Paper Presentations

MERITORIOUS AWARD

CITATION OF Dr SAMUEL ALFAYO BOH



It is my pleasure and singular honour to be called upon to read a citation on one of the eminent Doctor that the family of Alfayo has ever produced.

People are not chosen for their comfort, they most often to prepare for a life of self sacrifice and even sufferings on behalf of other. And most often their calling is not for privilege but for service. Whichever prism you use in view him, Dr Samuel Alfayo Boh a class teacher of high repute, a man of integrity and fear of God, sacrifices and service for the betterment and advisement of humanity.

May, 18, 1969 marked the beginning of the steadily progressive son of Boh colored mother and the Shongomite father. This account of this childhood and youth in Gombe State shows the prince he had to pay for such a birth. It did not take long before he was revealed as a man of vision and mission as every step he took in both early life and now was clogged with success, and a wide breath of accomplishment.

Dr.Samuel Alfayo Boh spends is early life in Boh with his parent. He attended Boh primary school from 1976 to1984 exposed his qualities as a gifted child enable him to proceed to Government Science Secondary School Kaltungo 1984 to 1987,Teachers College Gombe 1988 to 1990 the exceptional this qualities made way for him to enlist to College of Education Azare 1993 where he bagged National Certificate in Education (NCE) while in Azare, he was elected parliamentary student union 1994 to 1995 session and thereafter in the year 1987, he proceeded to famous University of Maiduguri Borno State and had a Bachelor of Education and passed with flying colours in 2000. Diploma in World Evangelism Mission Training Institute in Borno State in 1999. In 2001, the indefatigable Samuel was drafted in to the National youth service scheme in Tsafe, Zamfara State his service witnessed a continued story of one success after another like the Nehemiah of the Holy Bible. As a man who fully understand what benefits education could bring his way when tapped. Dr Samuel did not hesitate to define where he was headed for in that direction. In 2004, he gain admission to University of Maiduguri, Borno States as an intelligent

student, he graduated in 2008 with Master of Education in Curriculum and Instruction (M.ED). Diploma and Certificate in computer 2009. In the year between 2013 to 2016 he bagged Masters in Guidance and Counseling in Theological Seminary College Kaltungo in Gombe State. Moreover, the influence this celebrated academia exerted on him equipped him to master the techniques of research, the canons of interpretation and reconstruction of academic research, the craft and skills involved and teacher – students relationship in 2010 he proceeded to one of the best University in Nigeria University of Nigeria Nsukka in Enugu State and come out with Doctor of philosophy (Ph.D) in Curriculum and Instruction.

A man with a formidable profile charismatic personality, Dr Samuel is indeed an achieve per excellence he has not only carved a niche for himself, but has also made name and reputation in Nigeria. He has always impacted positively in the lives of everyone he meets. He has also shown high sense of professionalism and dedication to the service of humanity. On several occasion Samuel has interrupted his travels to attend to civilian, accident victims and he has truly saved a lot of lives.

Dr. Samuel Alfayo Boh started his civil service career as a classroom teacher; he had a little starting with the noble teaching profession. In 1996 he took appointment with Boh primary school, Labeke primary school in 1997, Kulishin primary school 1999, Pivotal Teachers Training Programme Lapan in 1999. In 2000 He moved to Government Day Secondary School Boh. In 2000 Tutor Senator T.U. Wada Educational Emancipation Scheme. Presently, lecturer with Federal University Kashere, in the Department of Educational Foundations

Dr. Samuel is a versatile personality of note and a man of many parts. He is fondly referred to as sport, Author and a born teacher of good repute. In his romance with great academics, he has received more than twenty awards, member of many associations, he has presented more than thirty academic papers in both international and national journals, he has published Ninety journals, sixteen book chapters, he has written eight books, presently chairman board of governors Jim Collis Kufai, fellow members of more than seven associations, former permanent commissioner sports commission Gombe State, chairman and secretary of many association, He is happily married to Mrs. Abigail Samuel and blessed with many children.

Having described himself as an enterprising person who has excellence attached to his name, Dr Samuel Alfayo Boh evinces a friendly disposition towards his students. He is a strong advocate of treating students with understanding and affection, Dr. Samuel incontestably mentors, counsels, reprimands, sympathizes and assists his young and old alike. Some of his students describe him as a luminous teacher whose passion for academic scholarship is infectious and whose pedagogical principle skills and friendly disposition are so admirable and endearing that attendance at his lectures is always high and far outstrips most others.

Ladies and gentlemen, Dr. Samuel Alfayo Boh is a small figure on the physical appearance. It is my great honour and privilege to call on this academic repute, erudite, scholar, indefatigable and inspirational mentor, community lover, and motivator ardent love of Shongomite culture and humanist to graciously joint the chairman and other for the formal presentation of this fabulous awards to acknowledge to celebrate his hard word, disciplines, kindness, humanness and commendable role he is playing in the academic careers and character-building

FOREWORD

It is with profound pride and optimism that I write this foreword to the maiden Book of Conference Proceedings of the Association of Science Educators Anambra State a timely and significant academic documentation that captures the robust engagements, research contributions, and transformative ideas presented at the 1st Annual Conference of the Association, scheduled for July 10, 2025, in Awka, Anambra State, Nigeria.

The conference, with the theme “Science Educators and Digital Literacy in the 21st Century,” could not have come at a more opportune moment. In an age where digital transformation is rapidly redefining education, economy, and society, the role of science educators in equipping learners with not only scientific knowledge but also digital competencies has become more critical than ever. The conference offered a strategic platform for scholars, researchers, policy makers, and practitioners to interrogate, share, and shape new pedagogical paradigms that incorporate digital literacy into the fabric of science education.

In his address of welcome, the Acting President of ASEA, Dr. Johnbosco O.C. Okekeokosisi, delivered a compelling call to action. He set the tone by acknowledging the historical importance of the event and the noble mission of ASEA to champion science education across Anambra State and beyond. His words reflected a clear vision of collective progress, innovation, and institutional synergy. Most notably, Dr. Okekeokosisi emphasized that digital literacy in science education is not merely about embracing technological tools but about empowering both educators and learners to critically engage, create, and transform scientific knowledge for societal advancement.

This compilation of conference proceedings is more than a record of presentations—it is a testimony to the enduring commitment of Nigerian science educators to adapt to global educational trends. With insightful keynote and lead paper presentations by eminent scholars such as Prof. Cecilia O. Ekwueme and Prof. Telima Adolphus, participants were exposed to a breadth of ideas, models, and classroom innovations. These contributions are now immortalized in this volume, accessible to researchers, policymakers, and education stakeholders worldwide. The articles by contributors are of quality standard and intimately related to the conference theme.

The proceedings are also a celebration of collective effort. Dr. Okekeokosisi rightly acknowledged the contributions of past leaders of STAN, the Executive Principal of Igwebuike Grammar School, the Local Organizing Committee, and institutional partners who ensured the success of this pioneering event. Their efforts reflect a shared belief in the transformative power of science education when driven by vision, collaboration, and strategic digital integration.

This book also symbolizes the maturity and forward-thinking disposition of ASEA. With its proceedings published online in the Association’s official website (www.jisepublications.org), ASEA is setting a benchmark for academic visibility, accessibility, and global relevance. The initiative aligns perfectly with the conference theme—leveraging digital platforms for knowledge dissemination.

As readers engage with the rich content within this publication, it is my hope that they find not only knowledge but also inspiration to further the cause of digital transformation in science education. May this volume serve as a resource, a reference, and a rallying point for continued innovation, research, and excellence in digital literacy, science teaching and learning.

Prof. Marcellinus C. Anaekwe
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National Open University of Nigeria,
Abuja.

PREFACE

Digital literacy in the 21st century is crucial for science educators to effectively teach and prepare students for a rapidly evolving scientific and technological world. Science educators must embrace digital tools and resources to enhance their teaching methods and foster students' scientific literacy, critical thinking and problem-solving skills. This includes leveraging online platforms, using educational technologies and digital content to create engaging and meaningful learning experiences.

In this conference proceedings efforts has been made towards promoting the use of digital tools in science education.

Prof. Josephine N. Okoli

Science Education Department

Nnamdi Azikiwe University, Awka,

Anambra State, Nigeriascience

ADDRESS OF THE ACTING PRESIDENT OF ASSOCIATION OF SCIENCE EDUCATORS ANAMBRA (ASEA), DR. JOHN BOSCO O.C. OKEKEOKOSI, AT THE OPENING CEREMONY OF THE 1ST ANNUAL CONFERENCE HELD IN AWKA, ANAMBRA STATE, NIGERIA ON 10TH JULY, 2025

Theme: “Science Educators and Digital Literacy in the 21st Century”

Distinguished Guests,

Mother of the Day, and Executive Provost of the Federal College of Education (Technical), Umunze, Prof. Tessy O. Okoli

Past and Immediate Past Chairmen of the Anambra State Chapter of the Science Teachers Association of Nigeria (STAN), Prof. C.V. Nnaka, Dr. Christiana U. Ezenduka Past and Immediate Past Secretary of the Anambra State Chapter of the Science Teachers Association of Nigeria (STAN), Dr. Chinwe B. Njelita, Mr. Kingsley N.C. Ezeokeke

The Executive Principal of Igwebuike Grammar School, Awka, Mrs. Amaka Ifebili

Our Esteemed Keynote and Lead Paper Presenters, Profs: Cecilia O. Ekwueme, Telima Adolphus

Meritorious Awardee, Dr. Samuel Alfayo Boh

Representatives of Educational Institutions, Pharm. Adauzoh C. Joe-Obasi

The Conference Planning Committee

The Local Organizing Committee (LOC),

My Fellow Science Educators,

Ladies and Gentlemen.

It is with deep humility and immense pleasure that I stand before you today as the Acting President of the Association of Science Educators Anambra (ASEA), to welcome you all to this historic gathering — the **1st Annual Conference** of our noble Association, taking place here in the vibrant capital city of Awka, Anambra State.

This moment marks a milestone in the life of our Association and in the educational landscape of our dear state. Today, we have gathered not just to deliberate on academic issues, but to collectively reflect on and shape the role of science educators in a rapidly changing digital world. The presence of each one of you here is a testament to your dedication to the advancement of science education in Nigeria, and in particular, in Anambra State.

Let me begin by extending heartfelt gratitude to our **Mother of the Day**, the erudite and distinguished **Executive Provost of the Federal College of Education (Technical), Umunze**, for honoring our invitation. Your presence is a great source of inspiration, and we are immensely grateful for your unwavering support towards science and technical education in the state. The Host and Board of Directors, Prof. Josephine N. Okoli, Prof. Isaac N. Nwankwo, Prof. M.C. Anaekwe

Chairman of the occasion Ass. Prof. Peter I.I. Ikoku

To the **Past Chairman and Immediate Past Chairman of Anambra State STAN**, we salute you. You laid the foundation for excellence and integrity in science education upon which ASEA continues to build. We are proud to carry forward the torch of progress you lit. Your legacies continue to motivate and guide our mission as science educators.

We also sincerely appreciate the **Executive Principal of Igwebuik Grammar School, Awka**, for the enormous and selfless support towards the successful hosting of this conference. Your generosity and logistical assistance have played a crucial role in bringing this vision to reality. We are proud to host this conference within your institution, and we thank you for embracing the ASEA family.

Special thanks also go to our **Keynote and Lead Paper Presenters**, whose scholarship and insight will surely enrich our understanding of the conference theme: *“Science Educators and Digital Literacy in the 21st Century.”* You are the thought leaders that will help us navigate this complex but exciting intersection between pedagogy and technology.

Meritorious Awardee, **Dr. Samuel Alfayo Boh**, whose contributions to teaching and learning in tertiary institutions lead to the foundation of our members.

The **representatives of educational institutions**, both public and private, we acknowledge your partnership and presence. Your contributions, ideas, and institutional support are essential in sustaining quality science education. Together, we can foster a generation of scientifically literate citizens equipped for the demands of the 21st century.

Let me also specially recognize the tireless efforts of the **Local Organizing Committee (LOC)**. You have worked round the clock, attending to logistics, communications, hospitality, and a host of behind-the-scenes responsibilities. This conference would not be possible without your selfless commitment. I say, “Well done!”

This conference has its theme **“Science Educators and Digital Literacy in the 21st Century”**. The theme is very apt considering the fact that we are in the digital age. Thus, the committee on conference looked inward to provide this conference theme for science educators to understand, educate, re-educate, write and deliberate on the effective use of digital tools – technologies in our present time for effective instructional delivery. Participants will be taken through hands-on and minds-on activities in various sessions and they will find the conference package very rewarding. I invite you to pay attention during keynote address to be presented by Prof. Cecilia O. Ekwueme, the Dean Faculty of Science Education, University of Calabar, Cross-River State, Nigeria. Your continuous attention is also needed during the lead paper presentation of Prof. Telima Adolphus of Rivers State University, PortHarcourt, Nigeria.

To all **participants** – educators, researchers, students, policy makers – thank you for making out time to be here. Your presence signifies hope for the future of science education. I urge you to make the most of this gathering by networking, exchanging ideas, and exploring new strategies to embed digital literacy in science classrooms and curricula.

As we delve into this conference theme, let us remember that digital literacy is not just about the use of devices or softwares. It is about empowering both teachers and learners to navigate, create, and critically evaluate digital content. It is about transforming science education into an interactive, engaging, and accessible experience that prepares our students for global competitiveness. We must rise to this responsibility with courage, collaboration and innovation.

As we officially declare this conference open, let us do so with a shared sense of purpose and vision. Let us reflect deeply, discuss intelligently and leave this gathering better equipped to build a technologically savvy and scientifically vibrant society.

Ladies and Gentlemen, it may interest us to note that this young growing association has an online Journal, Electronic Book (e-book) and Conference Proceedings. The E-Book and Conference Proceedings were hosted online at the association's website (jisepublications.org) for its visibility. It is obvious that this association has come to stay. To God be the glory.

Once again, I welcome you all to the 1st Annual Conference of the Association of Science Educators Anambra (ASEA). May our deliberations be fruitful, and may the bonds we forge here today grow stronger for the benefit of science education in our state and beyond.

Thank you, and God bless you all.

Dr. Johnbosco O.C. Okekeokosisi

Federal College of Education (Tech) Asaba,
Delta State, Nigeria
Acting President, ASEA
10th July, 2025

PAPER 15

EFFECTS OF GOOGLE CLASSROOM ON STUDENTS' ACHIEVEMENT IN NATIONAL BUSINESS CERTIFICATE (NBC) YEAR 11 ACCOUNTING STUDENTS OF STATE TECHNICAL COLLEGES

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Abstract

The need to improve students' academic performance in financial accounting necessitated the study to determine the effect of google classroom application on technical colleges in Anambra state. Two null hypotheses were formulated to guide the study, Quasi-experimental research design using pre-test posttest non-randomized control group design was adopted for the study. The population is made up of national business certificate (NBC) year 11 accounting students of state owned technical colleges . A sample of 177 year two students of technical colleges comprising of 95 female and 82 male were purposively sampled for the study. The google classroom application and accounting achievement Test (AAT) were the instruments used for data collection. The results of the study were analyzed using Analysis of Covariance (ANCOVA). The results revealed that there is a significant difference in students' scores in technical colleges taught with the google classroom application and those taught using conventional teaching method, there was also a significant difference in performance scores between male and female students exposed to google classroom application. It was recommended among others that google classroom application should be used always to promote students' academic performance in technical colleges and that teachers should equally upgrade their skills on the utilization of google classroom and other technological applications to stay afloat with 21st century skills online teaching and learning practices.

Keywords: Google classroom, achievement

Introduction

One of the subject that contributes immensely to the growth of any nation most especially in aspect of the economy is Financial Accounting. Nigeria Educational Research and Development Council (NERDC, 2007) stated that financial accounting curriculum has experienced constant reviews and amendments to suit the economic and financial needs of the country and to enable students to understand the financial and economic system of Nigerian sectors. Ubulom and Ogwunite (2017), states that Financial Accounting helps in the acquisition of vocational skills, knowledge, attitudes, values and competencies towards solving problems and the satisfaction of real needs in life. Agbata, Okaro and Onyeogubalu (2022) upheld that Financial Accounting through all its various transformations serves as a train that moves sustainable development. This is why Osualu (2004) states the objectives of Financial Accounting as follows; to enable students become proficient in financial transactions and management, to give students additional vocational skills that will enhance their opportunities for future occupational success, , to provide vocational training to students in the practical knowledge of daily bookkeeping activities, to equip students with better understanding of business practices and procedures, and to help students understand the cycles and steps involved in financial accounting so that the relations of each step to all other steps are properly understood. In order to achieve these stated objectives, financial accounting teachers must

employ different method of teaching in classroom and use recommended instructional materials and evaluation techniques.

In spite of the objectives of Financial Accounting and its great significance to the individual and national development, a close analysis of students' Achievement in Senior Secondary School Financial Accounting Examination in the last four years (2017-2020) shows clearly the deteriorating state of secondary school students' Achievement in Financial Accounting. In the same vein Ezeagba (2014) blamed the poor performance in financial accounting on the predominant use of conventional teaching approach where teacher dominates the class and does not encourage students to participate in the learning process. Owenvbluge and Iyoha (2017) opined that the ineffectiveness of teachers in classroom interaction with the students could be responsible for the observed poor performance of students and the widely acclaimed fallen standard of education. The low academic performance of senior secondary school students in financial accounting in Anambra State arouses doubts on the effects of instructional methods and resources used by teachers in senior secondary schools. In Nigeria, efforts are being made by researchers to introduce new innovative instructional resources for efficient impartation of financial accounting knowledge on students. To address the performance and low registration of secondary school students in Nigeria, Adamu and Kusa (2018) posited that there is need to shift from behaviorism instructional strategy to constructivism approach.

Online learning instructional resources is a constructivism instructional approach. On these background it becomes imperative to assess how the learning of Financial Accounting through online learning instructional resources such as google classroom can have effect on academic achievement of students in the subject. Students need to be taught with innovative instructional resources, it will enable them think critically and explore their environment and acquire skills to become further accountant and chattered accountant which most uninspired resources cannot achieve. Teachers need innovative instructional resources such as online instructional resources which include google classroom, to see if it can improve academic achievement of secondary school students in financial accounting.

This study's concern is on using online learning instructional resources. In 2020, the concept of online instructional resources in Nigeria gained prominence due to the COVID-19 pandemic, which forced a shift towards online learning. This involved utilizing digital tools and platforms to deliver educational content and facilitate learning experiences remotely. Online instructional resources refer to digital materials used for teaching and learning, and are accessible from the internet. Online instructional resources are educational materials and tools designed for online delivery and interaction, which include;

- **E-learning platforms:** Learning Management Systems (LMS) like Moodle, Canvas, or Google Classroom that host course materials, activities, and assessments.
- **Online learning materials:** Digital versions of textbooks, lecture notes, presentations, videos, interactive exercises, and simulations.
- **Multimedia resources:** Audio and video recordings, podcasts, and interactive animations to enhance learning.
- **Open Educational Resources (OER):** Freely available and openly licensed educational materials that can be adapted and reused. These resources aim to support and enhance the

teaching and learning process in an online environment. Nwaokugha and Frank (2023) stated that online teaching and learning is one hundred percent dependent on digital technologies and their accessories. Online learning instructional resources may transform and improve students achievement and retention in financial accounting, online learning instructional resources that can be adopted to enhance financial accounting lessons include, google classroom.

Google classroom was introduced in 2014 by Google Application for education. It enables the teacher to create a digital classroom for students to communicate with them and their fellow peers. Teachers can upload video, files, links, assignments and announcements for students to retrieve and view. According to Abubakar and Adamu (2024), Google Classroom, is a free web service developed by Google for schools, it has emerged as a prominent tool in this digital revolution. It aims to streamline the process of sharing files between teachers and students, facilitating a more organized and accessible virtual learning environment. Google classroom is a learning strategy that has evolved into a platform for promoting critical thinking, collaboration, and social interactions with peers and teachers on academic activities (Oyarinde & Komolafe 2020). Google Classroom is accessible from any device with a web browser, and it also has dedicated apps for Android and iOS devices. Google Classroom offers various features and benefits for educators and students, such as setting classroom themes, reusing assignments, adding content to assignments, sharing videos, links, or images, viewing assignments, announcements, and resources on a class page, drafting and scheduling posts, setting up Google Calendar, exporting grades, setting permissions, hosting virtual classes, originality reports, and image capturing. According to Daramola and Umoru (2021) Google classroom allows learners to chat and discuss topics learned in class, and allows teachers to view student discussion, and post comments. Different assignments can be posted such as video segments, PowerPoint presentations, documents and web quests. Google classroom is considered as one of the best platforms for enhancing teachers' workflow. It provides a set of powerful features that make it an ideal tool to use with students. Anakwe and Amadi (2020) opined that google Classroom is considered as one of the best platforms out there for enhancing teachers' workflow. It provides a set of powerful features that make it an ideal tool to use with students. Helping teachers save time, keep classes organized, and improve communication with students. Google Classroom is a suite of online tools that allows teachers to set assignments, have work submitted by students, to mark, and to return graded papers. Google Classroom is a free blended learning platform developed by Google for educational institutions that aims to simplify creating, distributing, and grading assignments (George & Osuafor 2023) These features of Google Classroom and its importance in enhancing academic engagement and collaboration makes it unique among other learning management system. Furthermore, Google Classroom is accessible on multiple devices, including desktop computers, laptops, tablets, and mobile phones, which enhances its usability and convenience (Sahito & Vaisanen 2017). Google Classroom is cloud-based. Therefore, it is accessible anywhere and anytime from any device with an internet connection.

Statement of Problem

The outbreak of the COVID-19 forced educationists to switch to organizing classes online. COVID-19 pandemic has greatly posed challenges in the teaching and learning process to educationist and the education sector. All around the world, educational institutions are looking toward online learning platforms to continue with the process of educating students. Financial

accounting teaching and learning is not left out of the global pandemic challenges. Teaching without online learning instructional resources may be difficult in the event of another round of school closure and the coverage of curriculum contents in financial accounting may be adversely affected just like it did during the COVID-19 pandemic. The ability of the students to be positive in learning and character may depends on the instructional resources of the teachers. One of the major difficulties facing the education sector in Nigeria is the poor academic achievement of students in local and standardized examinations. Poor academic achievement of vocational subject students especially in Financial Accounting at senior secondary school certificate examination by Nigeria students had been a cause of concern for Financial Accounting teachers and other stakeholders in education. This situation has been blamed on many factors especially the instructional resources used in teaching Financial Accounting. Different instructional resources such as textbooks, accounting ledger, and receipts have been used but do not seem to have improved the academic achievement of students in Financial Accounting. Dias et al (2017) tend to justify that the method of computer-based teaching strategy which is an online learning instructional resources has the potential of motivating the students by turning them to active participants in learning especially in financial accounting on how to use Microsoft excel, spreadsheet to solve mathematical problems and drawing of accounting tables with computer. The problem of this study therefore, put in a question form: What is the effect of google classroom on national business certificate students' achievement in accounting ?

Purpose of the Study

The purpose of the study is to determine the effect of google classroom on students' achievement in national business certificate year 11 accounting students. The study specifically seeks to;

1. Determine the achievement mean scores of students exposed to google classroom and those in conventional group.
2. The mean achievement scores of male and female students taught financial accounting using google classroom.

Research Questions

The study was guided by the under listed research questions;

- 1 What are the mean achievement scores of students exposed to google classroom and those taught using conventional teaching method (CTM)?
- 2 What are the mean achievement scores of male and female students exposed to google classroom?

Hypotheses

The following null hypotheses were formulated and tested at 0.5 level of significance to guide the study:

H01: There is no significant difference in the mean achievement scores of students exposed to google classroom and those taught using CTM.

H02: There is no significant difference in mean achievement scores of male and female students exposed to google classroom.

Methodology

The research design for this study is a Quasi-experimental design using pre-test post-test non-randomized control group design. Quasi experimental design is a design in which an independent variable is directly manipulated to measure its effect on a dependent variable and participants are not randomly assigned to comparison groups. Quasi-experimental design was suitable for this study because the design establishes the effect of treatment (Google classroom) on students' academic performance and will comprise students' in their intact class setting. The pre-test provided a check on the non-random assignment of subject to groups. The purposive sampling techniques was adopted in the selection of students based on the following criteria.

- a. Their existing knowledge on ICT resources such as media, internet, computer, web-based tools, m-learning and e-learning.
- b. Must have received lectures, submitted assignments and interacted through an online learning platform.
- c. Must own an internet enabled / smart phone

Two instruments were used for the study, namely; financial accounting achievement Test (FAAT) and consisting of a 20 items multiple choice test with four options lettered A to D, with a score of 5 marks for each correct answer.

The second instrument used was the Google classroom treatment, comprising of ICT topics and database management system (DMS) used for the experimental study.

Results

The result obtained are presented in the light of the research questions and hypotheses formulated to guide the study.

Research Question 1: What is the mean achievement scores of students exposed to google classroom and those taught using conventional method.

Table 1: Mean Achievement and Standard Deviation of students taught financial accounting exposed to google classroom and those taught using conventional method

Teaching approach	N	\bar{X}	SD	N	\bar{X}	SD	\bar{X}	Score
Treatment	96	19.85	4.22	96	24.54	5.18	4.69	
Control	81	16.11	4.17	81	20.00	4.71	3.89	

The result presented in Table 1 showed that the financial accounting students exposed to google classroom instructional resources had a pretest achievement mean score of 19.85 with standard deviation of 4.22 and a posttest achievement mean score of 24.54 with a standard deviation of 5.18. The mean gain achievement scores for students exposed to google classroom was 4.69. The financial accounting students taught using conventional teaching method had a pretest achievement mean of 16.11, standard deviation of 4.17 and a posttest achievement mean of 20.00 with standard deviation of 4.71. The mean gain achievement scores for the students taught using conventional teaching method was 3.89. The mean gain scores of 4.69 for experimental group and 3.89 for control group indicated the financial accounting students exposed to google classroom achieved higher than those taught using conventional teaching method.

Hypothesis 1: There is no significant different in the mean achievement scores between students taught financial accounting using google classroom and those taught using CTM.

Table 2: Analysis of Covariance of students mean achievement scores in Financial Accounting

Sources of variation	Type of sum of Square	Df	Mean square	F	Sig
Corrected model	2129.324a	4	425.365	97.519	.001
Intercept	35700.625	1	35700.625	8175.116	.001
Pretest	89.117	1	89.117	15.101	.001
Group	1341.341	1	670.670	153.577	.001
Error	1369.342	177	4.367		
Total	223799.543	180			
Corrected	2583.491	179			
Total					

Table 2 showed that there is a statistically significant different in mean achievement scores of students taught financial accounting using google classroom and those taught with conventional instructional method, $F = 153.58$. The obtained p-value (.000) is less than the stipulated level of significance (.05). The null hypothesis of no significant between the two groups was therefore rejected.

Researcher Question 2: What is the mean achievement scores of male and female students taught financial accounting using google classroom and those taught using CTM?

Table 3: Mean Achievement and standard deviation scores of male and female students taught financial accounting using google classroom.

Gender	N	\bar{X}	SD	N	\bar{X}	SD	\bar{X}	Score
Male	45	10.14	3.15	45	13.12	4.00	2.98	
Female	51	9.32	3.22	51	12.00	2.55	2.78	

The Table 3 result showed that the male financial accounting students exposed to google classroom had a pretest mean achievement score of 10.14 with standard deviation of 3.15 and a posttest mean achievement score of 13.12 with standard deviation of 4.00. The mean gain achievement score for the male was 2.98. The female financial accounting students had mean achievement score of 9.32 with standard deviation of 3.22 and a posttest achievement score of 12.00 with standard deviation of 2.55. The mean gain achievement score for the female financial accounting was 2.78. Each of the group posttest mean achievement scores were greater than their pretest mean scores. This suggest that gender may have some influence on students achievement in financial accounting when exposed to google classroom .

Table 4: Analysis of Covariance of male and female students' mean achievement scores in financial accounting

Sources of variation	Type of sum of Square	Df	Mean square	F	Sig
Corrected model	1353.11a	4	270.624	22.875	.001
Intercept	30689.864	1	30689.864	2594.129	.001
Pretest	80.191	1	80.191	11.222	.001
Gender	1.944	1	1.944	164	.686
Error	1230.373	177	11.831		
Total	48770.000	180			
Corrected	2583.491	179			
Total					

Table 4 shows that there is no statistically significant difference in mean achievement scores of male and female secondary school students taught financial accounting using google classroom instructional resources. The significant p- value for achievement was 0.001 and that of gender was 0.68 was found to be higher than $p < 0.05$ alpha levels. Therefore, the null hypothesis which states there was no significant difference in the mean scores of male and female financial accounting students exposed with google classroom was no rejected.

Discussion

The findings of this work were discussed in line with the research questions that guided the study. The result of the analysis of the difference in the academic performance of students in financial accounting exposed to google classroom application and those taught using conventional teaching method revealed that there is significant difference in the academic performance of student's in financial accounting exposed to google Classroom and those taught using conventional teaching method. This finding was in line with the study of Ekpo-eloma et al (2022) who conducted a study on the effect of Google classroom application on undergraduate students' scores in educational technology in university of calabar. The researcher followed the experimental approach in implementing the google classroom on the research sample. The controlled group was taught by the traditional way while the experimental group studied using Google classroom. The results showed that there were significant statistical differences in the result between the experimental and control group when google classroom was used. The result based on gender revealed that there is no significant difference in the academic achievement of students in financial accounting exposed to google classroom and those taught using conventional teaching method based on gender. It means that in spite of the gender, once innovative instructional strategy is used for teaching, student's performance will be improved.

Conclusion

From the findings google classroom as a global infrastructural tool, holds great prospects for improving students academic achievement has proved to be effective in increasing financial accounting students' academic achievement and bring out the best in financial accounting student as well as improving student learning concepts.as the study shows.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Most subjects in the technical colleges curriculum should be taught using Google classroom application.
2. Teacher should upgrade their skills on the utilization of Google classroom and other technological applications practices.
3. Teachers should act as guides on the side and allow learners to take control of their learning, this will enhance their participation thereby increasing their academic performance.
4. school management should make possession of smart/and android phone an entry requirement for all students of technical colleges at the point of admission.

References

Abubakar , S.A. & Adamu, L.A. (2024). Usage and acceptance of google classroom among VTE students in Nigerian universities based on technology acceptance model. *Journal of emerging technologies and innovative research*, 11 (6); 550-558.

Adamu, I. & Kusa, G.W. (2018). Effect of peer tutoring learning teaching method on academic performance of financial accounting students in federal unify colleges in north eastern, Nigeria. *Journal of advanced research in social science*, 1 (1); 7-15.

Agbata, A.E., Okoro, S.C. & Onyeogubal, O.N. (2022). Role of accounting in sustainable development in Nigeria. *Annals of the university of cralova of Journalism communication management*, 8; 98-106.

Anakwe, J.U. & Amadi, u. (2020). Effect of google classroom on interest and performance of trainee teachers in computer education. *International Journal of research and development*, 5 (4); 103-113.

Daramola, R. & Umoru, A.A. (2021). Effects of google classroom on the academic performance of business education students in cost accounting in federal colleges of education. *Journal of education and practice*, 12 (19); 31-37.

Dias, S.B. et al (2017). Computer based concept mapping combined with learning management system use. *An explorative study under the self and collaborative mode*. *Computers and education* 107.

Ezeagba, C. (2014). The problem in the teaching and learning of accounting as a vocational subject in Nigeria secondary schools. *AFRREV STECH: An International Journal of science and technology*, 3 (2); 218-226.

George, P.C. & Osuafor, A.M. (2023). Effects of flipped classroom instruction via google classroom on secondary school students academic attitude towards chemistry in Onitsha education zone of Anambra state of Nigeria. DO:/<https://dxorg no.477721ijriss>

Nwaokugha, D.O. & Frank, F.K. (2023). Online teaching and learning during COVID-19 in Nigeria: prospects, challenges and revelations. *International Journal of research and review*, 10 (3); 78-98.

Osuala, E.C. (2004). *Foundation of vocational education*. (5th ed). Enugu: Cheston agency Ltd.

Oyarinde, O.N. & Komolafe, O.G. (2020). Impart of google classroom as an online learning delivery during COVID-19 pandemic.: the case of secondary school in Nigeria. *Journal of education, society and behavioural science*, 33 (9); 53-61

Sahito, Z., & Vaisanen, P. (2017). Effect of ICT Skills on the Job Satisfaction of Teacher Educators: evidence from the Universities of the Sindh Province of Pakistan. *Int.J. High. Educ.* 6 (4); 122-136. doi: 10.5430/ijhe.

Ubulom, W.J. & Ogwunite, P.C. (2017). Evaluation of teacher-centered and learner-centered methods for instructional delivery of senior secondary school