EFFECT OF TELEGRAM AND WHATSAPP-ENHANCED INSTRUCTIONS IN COLLABORATIVE LEARNING SETTINGS ON LEARNING OUTCOMES IN MICRO-TEACHING AMONG UNDERGRADUATES IN GOMBE STATE

BY

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A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGERIA IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF TECHNOLOGY IN EDUCATIONAL TECHNOLOGY

ABSTRACT

The study investigated the effect of Telegram and WhatsApp-enhanced instruction in collaborative learning settings on learning outcomes in micro-teaching among undergraduates in Gombe State. The study was guided by seven research questions and seven null hypotheses. The study adopted a pre-test post-test quasi-experimental design. A total of 1012 year three faculty of education students in Gombe State comprised the population used in the study. A sample of 282 students that were enrolled on Telegram (117: male= 61; female= 56) and WhatsApp (165: male= 86; female= 79) from Federal University Kashere and Gombe State University respectively were purposively selected for the study. The two sampled groups were assigned into experimental group I (Telegram) and experimental group II (WhatsApp) in collaborative learning settings by balloting sampling. The instruments for the study comprised of Micro-teaching Achievement Test (MTAT) and Collaborative Learning Questionnaire (CLQ) which were validated by four experts. The instruments were subjected to pilot tests where split-half method of reliability was used to obtain a value of 0.91 using PPMC for MTAT, while a value of 0.84 was obtained for CLQ using Cronbach alpha. Descriptive statistics involving Mean and Standard Deviation was used to answer the research questions while inferential statistics involving t-test was used to test the null hypotheses at 0.05 level of significance. Findings revealed that there was a significant difference in the mean achievement scores of the two groups in favour of WhatsApp platform ($t = 3.264$, $p<0.05$); there was a significant difference in the mean retention scores of the two groups in favour of WhatsApp platform ($t= 4.292$, $p<0.05$); there was no significant difference in the mean achievement scores of male and female students taught using telegram platform ($t= 2.571$, $p>0.05$); there was no significant difference in the mean achievement scores of male and female students taught using WhatsApp platform ($t= 3.671$, $p>0.05$); there was no significant difference in the mean retention scores of male and female students taught using Telegram platform ($t=5.274$, $p>0.05$); there was a significant difference in the mean retention scores of male and female students taught using WhatsApp platform in favour of the female students ($t= 4.071$,$p<0.05$); there was a significant difference in the extent of collaboration of the students in the two groups in favour of the WhatsApp platform ($t= 5.217$, $p<0.05$). It was therefore recommended that lecturers should deploy the use of Telegram and WhatsApp to cover for large classroom sizes, lack of micro-teaching laboratory and other tight schedules. Lecturers should also adopt the use of Telegram and WhatsApp in collaborative learning settings during classroom instruction because they are engaging, interactive, interesting, and very flexible.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AIFCE: Alvan Ikoku Federal College of Education

ANCOVA: Analysis of Covariance

ANOVA: Analysis of Variance

EFL: English as Foreign Language

ICT: Information and Communication Technology

MTAT: Micro-teaching Achievement Test

NOUN: National Open University of Nigeria

NUC: National Universities Commission

PDF: Portable Document File

SPSS: Statistical Package for Social Science

STEP: Secondary Teacher Education Programme

CLQ: Collaborative Learning Questionnaire

TLP: Telegram Learning Platform

UNDP: United Nations Development Program

UNESCO: United Nations Scientific and Cultural Organization

WLP: WhatsApp Learning Platform

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

Technology has permeated almost all human endeavours and its importance has cut across all facets of life. Advancement in technology has transformed teaching and learning to be more student-centred through the incorporation of technology in education (Nwanna *et al.*, 2017). Technology offers a different approach to teaching and learning because it avails students the opportunity to interact and share ideas, as well as to make learning more interesting and effective. The use of technological applications has made teaching and learning easy and interesting.

Technology assists students in gaining knowledge, skills and techniques as they interact with each other. Educators now send instructional contents in a more flexible ways because, through the use of technology, instructors can communicate through voice, images and texts. Technology provides interesting opportunities that enrich and transform teaching and learning, thereby providing teachers and students with new tools to access, organise and present information with the aim of enriching lessons using various multimedia (Phelps & Maddison, 2008). The increased access to technology in the classroom has improved the potential for teachers to optimize students' learning through the combination of both online learning programme and face-to-face student-teacher interaction. Azman *et al.* (2018) believed that most learners are visual learners as technology has become an integral part of their lives and without technology they may not be able to learn effectively.

The world of teaching and learning is experiencing a massive change in terms of lesson delivery, and with increased access to technology in the classroom, this has improved the potential for teachers to achieve their objectives of learning through the combination of both online learning programme and face-to-face student-teacher interaction. Teachers now spend less time in imparting knowledge because they have the appropriate technology to augment normal classroom session. Technology has made it possible for students to learn and interact with one another on various online platforms like the social media and the internet. Technology is being used for teaching especially through social media learning that is now on the rise.

Social media are a web-based services that permit users to create a personal profile, identify other friends on the same site, read and reply to postings made by other users on the spot, send and receive messages either privately or publicly (Boyd & Ellison, 2007). As a website built technology, social media allows individual or group of individuals to express themselves and interact socially with others. When used in educational settings, it allows students to learn in groups and for them to exchange views on various platforms. McLoughlin and Lee (2010) stated that using social media networks in the educational process help educators to apply the inquiry-based approach and encourage interaction between instructors and the students, thereby encouraging engagement. Social media are web-based sites that allow students to interact and exchange ideas relating to their class engagement amongst themselves and with their teachers. It is an online platform that encourages interaction through a series of communication and network with the aim of facilitating learning.

The world has become a global village where everyone uses mobile phones connected to the internet for various purposes. Teachers now design and deliver lessons at their

convenience via various social media platforms. Integrating social media in classrooms is becoming an important part of teaching and learning process. Tutors around the world have been exploring how social media can benefit students. The use of the social media increases interaction between all those parties involved in the teaching and learning process (Arnold & Paulus, 2010). Of recent, social media platforms like Telegram enable teaching and learning to be interactive and simplified because of the active engagement involved.

Telegram application is one of the most common user friendly social media platforms today which allows users to create groups of up to 200,000 members and channels for transmission to infinite audiences. Telegram is so flexible that it can be used not only to send and receive texts, images, audio and video but also documents in different formats like Microsoft word, Microsoft excel and portable document format (PDF). It should be noted that these types of documents are the main formats often used by lecturers to prepare notes, tutorials and assignments and then share with their students (Vivienne, 2016).

Telegram platform offers a student-centred teaching and learning engagement that uses online learning resources to facilitate information sharing outside the constraints of time and place. Telegram combines self-study with asynchronous interactions to promote learning, and it can be used to facilitate learning in conventional settings, as well as distance and continuing education (Denysiuk *et al.*, 2018). Telegram platform can be an appropriate medium to help in learning different skills, increase students' achievement, motivation and confidence. Interactive platforms like Telegram has feedback features where students can comment, repost, and communicate with both teachers and students. This platform can be used to post assignment, start a discussion, pass information and encourage high collaboration. Comparable to Telegram in the areas of online discussion and interaction is the WhatsApp application that is used by a wide range of users worldwide.

The WhatsApp application provides online users with the ability to send and receive a variety of media, such as images, documents, videos and audio media messages (Amry, 2014). WhatsApp platform has so many features that enable students and teachers to exchange ideas as well as contents among themselves without difficulties. WhatsApp can be used by teachers in education to foster learning and students can use it to send and receive messages. It also enables them to incorporate the use of multimedia.

WhatsApp is currently the biggest online messenger in the world that enables users to exchange messages. Liya and Dede (2017) reported that WhatsApp, as the biggest online messenger, is compatible with a smartphone, tablets, and computer application for instant messaging that provides several features. It can send messages, files, documents, images, audio, video, and location. One of the key features of WhatsApp is its ability to facilitate communication via groups that can contain up to 256 members and it uses internet to send messages or document. WhatsApp, according to Bere (2012), has the following collaborative features: multimedia that supports the interaction of so many group members, unlimited messaging, cross platform engagements, offline messaging, no charges involved, and users' names are not needed. Above all, WhatsApp has become a shared platform that enhances accessibility, encourages cooperation, thereby intensifying motivation to take an active part in academic assignments. This enables active studentteacher participation as well as student-student participation in a collaborative manner. The active engagement and interaction of students in a WhatsApp group discussion encourages high collaboration amongst students and their tutors.

Collaborative learning is very essential in teaching and learning because of the role it plays in enhancing learning. Collaborative learning encourages learners' active engagement in the learning process when they are involved in searching, finding and evaluating information from different sources such as peers, teachers and the wider society to increase

their knowledge hence, becoming accountable and responsible for the successful achievement of their own learning outcome and that of others. As noted by Williams and Augustine (2015), collaborative learning affords students so many enormous advantages that are not available in conventional settings. This is because an interactive learning, either in an entire class or a learning group within the class, can accomplish meaningful learning or solve problems better than any individual alone.

Additionally, collaborative learning also has the potential, according to Srinivas (2014), to increase learners' interest, motivation, retention and achievement in learning activities; it increases students' responsibility for learning; promotes innovation in teaching and classroom techniques; addresses learning style differences among students; and develop interpersonal and social skills among learners. Collaborative learning is based on the idea that learning is a natural social act where participants talk among themselves. It therefore means that learners need a social environment where they will have the opportunity to interact, communicate, share and construct knowledge with others for effective learning to take place. Under a collaborative learning situation, learners are challenged socially and emotionally as they listen to different perspectives, and are required to articulate and defend their ideas (Williams & Augustine, 2015). Based on the foregoing discuss, collaborative learning can be of great importance towards presentation of micro-teaching.

Micro-teaching is a scaled-down simulated teaching designed for the training of both preservice and in-service teachers. At the university level, it is taught in order to perfect the skills of the student-teachers and to enable them to prepare for the teaching-practice exercise and to prepare for life as professional teachers. Apart from being an essential process of transforming and modifying the student-teacher behaviour to demonstrate a given behaviour, micro-teaching also provides a huge opportunity for students to develop

and improve their pedagogical skills within a small group of students mostly using limited period of 5-10 minutes, records on video tape for reviewing, responding, refining and re-teaching towards perfection (Garba, 2018). Micro-teaching enables studentteachers to focus their attention on some specific skills at a time until mastery is attained. After acquiring competence in a number of skills in this way, the student-teacher takes to micro-teaching so as to demonstrate some level of competence. It is a vital technique that provides continuous training to serving teachers.

Furthermore, due to the importance attached to micro-teaching, the National Policy on Education stressed the need that teachers in Nigerian educational institutions will be professionally trained, and that education programme shall be structured to equip teachers for effective performance. Garba (2018) stated that the policy stressed the incorporation of Information and Communication Technology (ICT) training into teaching and thus, order to achieve this objective, micro-teaching in both pre-service and in-service training must be enhanced. Micro-teaching provides a golden opportunity to the student-teacher towards exercising control over some variables, which may have tremendous effect in teaching and learning like large class, the nature of the student, the length of the period for micro teaching administration, the motivation as well as the evaluation of the student. With the policy stressing the use of technology in classroom teaching, the learning outcomes of students especially in micro-teaching will be increased if technology is properly used.

Learning outcomes describe the significant skills that must be achieved by the learners at the end of the program. Effective learning cannot be attained if the lesson objectives have not been met. Learning outcomes denote all the essential knowledge and skills which a learner has achieved and is also expected to demonstrate at the end of a particular program (Ofoka, 2019).

It is also important to note that effective teaching brings about a great increase in the achievement level of students especially in micro-teaching.

In the same vein, achievement generally signifies the outcome of learning, having exposed the student to a particular treatment. According to Kayii and Dambo (2018), achievement is a measuring scale that tells the degree of performance to which a student has accomplished a specific task at the end of the instructional engagement. Vimala and Lawrence (2013) added that achievement is a measure of the knowledge gained in a formal education settings and it is usually indicated by test scores. Similarly, Kpolovie *et al.* (2014) stated that achievement is the ability of the student to study and remember facts and being able to communicate the knowledge obtained orally or in a written form during an examination condition. In some cases, a high academic achievement can lead to a higher retentive ability amongst students.

Retention, which is one of the learning outcomes in this study, is the ability of the learner to learn facts in memory. It is the ability to reproduce what has been learnt when the time arises (Ilobeneke *et al.*, 2018b). Retention is the ability to remember things that have been taught. Students' retentive ability can be enhanced through the use of appropriate technology like teaching student through social media platforms. However, students' achievement and retention may be influenced by gender in some cases due to individual differences that exists among students.

Similarly, gender, as a moderating variable, has the ability to influence academic performance and retention. It is an attribute that differentiates between male and female in the classroom. Gender is the masculinity and feminity attributes which describes humans. These attributes differentiate societal duties, responsibilities, attitudes and values between

males and females (Gambari *et al.*, 2017). Research shows that men are more likely to use social media to connect with people while women use social platforms to seek information (Haferkamp, *et al.*, 2012). Haq and Chand (2012) carried out a research on pattern of social media usage and its impact on academic performance of university students based on a gender comparison. The study revealed that social media use adversely affect the academic performance of male students as compared to female students.

The number of students in Nigerian universities undergoing micro-teaching with large student population that does not favour adequate classroom engagement, and inadequate time for everyone to present and to be properly assessed by the tutors have become a huge source of worry to educators. Consequently, the use of social media platforms will be of tremendous help towards bridging those gaps, as well as enabling students to perform well, increase their retention as well as collaboration.

It is against this background that there is need to investigate the effect of Telegram and WhatsApp-enhanced instructions in collaborative learning settings on learning outcomes in micro-teaching among undergraduates in Gombe State, Nigeria.

1.2 Statement of the Research Problem

Micro-teaching is a course taught at undergraduate levels in Nigerian Universities with the aim of exposing students to all the rudiments of teaching. However, in spite of the technological advancement that has made teaching and learning to be effective, flexible, collaborative, engaging and interesting, lecturers do not leverage on the collaborative features provided by Telegram and WhatsApp platforms which take care of challenges such as lack of micro-teaching laboratories, large classroom sizes and inadequacy of time for students to present and be properly accessed. These challenges, if not checked, will

lead to the production of teachers who are not well grounded thereby worsening the problems of education in Nigeria.

Several studies on the effects of Telegram and WhatsApp were conducted by various researchers (Fathi, 2018; Shima & Saeed, 2018; Nabati, 2018; Gurluyer, 2019) but none, to the best knowledge of the researcher, was carried out on micro-teaching in collaborative learning settings in Nigeria. Thus there is need to incorporate Telegram and WhatsApp platforms in collaborative learning settings to cover for lack of microteaching laboratories, large classroom sizes and inadequacy of time where teachers and students can collaborate in groups in order to improve learning.

In light of these challenges, this study therefore seeks to investigate the effect of Telegram and WhatsApp-enhanced instructions in collaborative learning settings on learning outcomes in micro-teaching among undergraduates in Gombe State, Nigeria.

1.3 Aim and Objectives of the Study

The aim of this study is to investigate the effect of Telegram and WhatsApp-enhanced instruction in collaborative learning settings on learning outcomes in micro-teaching among undergraduates in Gombe State.

Specifically, the study sought to:

1. Determine the effect of Telegram and WhatsApp-enhanced instruction in collaborative learning settings on the achievement of undergraduate students in micro-teaching.

2. Examine the effect of Telegram and WhatsApp-enhanced instruction in collaborative learning settings on the retention of undergraduate students in micro-teaching.
3. Examine the influence of gender on the achievement of undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings.
4. Find out the influence of gender on the achievement of undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings.
5. Examine the influence of gender on the retention of undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings.
6. Find out the influence of gender on the retention of undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings.
7. Determine the extent of collaboration among undergraduate students taught micro-teaching using Telegram and WhatsApp-enhanced instruction in

   collaborative learning settings.

1.4 Research Questions

The following research questions were raised and answered in this study:

1. What is the difference in the mean achievement scores of undergraduate students taught micro-teaching using Telegram and WhatsApp-enhanced instruction in collaborative learning settings?

2. What is the difference in the mean retention scores of undergraduate students taught micro-teaching using Telegram and WhatsApp-enhanced instruction in collaborative learning settings?
3. What is the difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced

   instruction in collaborative learning settings?
4. What is the difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced

   instruction in collaborative learning settings?
5. What is the difference in the mean retention scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced

   instruction in collaborative learning settings?
6. What is the difference in the mean retention scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced

   instruction in collaborative learning settings?
7. What is the difference in the mean collaboration scores of undergraduate students taught micro-teaching using Telegram and WhatsApp-enhanced

   instruction in collaborative learning settings?

1.5 Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

HO_1: There is no significant difference in the mean achievement scores of undergraduate students taught micro-teaching using Telegram and WhatsAppenhanced instruction in collaborative learning settings

HO_2: There is no significant difference in the mean retention scores of undergraduate students taught micro-teaching using Telegram and WhatsApp-enhanced

instruction in collaborative learning settings

HO_3: There is no significant difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings

HO_4: There is no significant difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings

HO_5: There is no significant difference in the mean retention scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced

instruction in collaborative learning settings

HO_6: There is no significant difference in the mean retention scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced

instruction in collaborative learning settings

HO_7: There is no significant difference in the mean collaboration scores of undergraduate students taught micro-teaching using Telegram and WhatsAppenhanced instruction in collaborative learning settings

1.6 Significance of the Study

The findings of this study will be of immense contribution to the following set of people: lecturers, curriculum planners, administrators, researchers, policymakers and studentteachers.

The finding of this study would be of great importance to lecturers who are actively involved in the process of teaching and learning especially the ones who teach microteaching in tertiary institutions. The findings will equip them with the importance of adopting of various social media platforms as well as the need to augment their conventional lectures with social media. The outcome of the study would unveil the process of using social media and how it can be used to foster teaching and learning. Social media provide flexibilities for lecturers to asynchronously connect with their students at home and in other places even without meeting face-to-face. It will also enable lecturers to see the importance of collaborative learning and the need to make learning more student-centred through active interaction and engagement.

The findings of this study would enable curriculum planners to incorporate social media enhanced learning in a digital world where technology has permeated all human endeavours and failure to adopt the use of technology would mean backwardness. The findings will make available information to curriculum planners on the various steps and stages of using social media to enhance teaching and learning as well as making learning more interactive.

The findings of this study would enable education policy makers to give serious attention to social media learning when it comes to policies pertaining universities. This will help in the production of teachers that are technologically savvy and competent through workshops and trainings which, by implication, will lead to advancement in the education sector.

The findings of this study would equip student-teachers with the necessarily skills needed for classroom instruction as well as management. It would make them to realise that social

media platforms are not only for social interactions but can actually be used to learn and even collaborate with one another in order to master their subject matter without much difficulty. Furthermore, it will boost their confidence and increase their level of engagement. Even those students who find it difficult to contribute under normal physical classroom lectures can easily participate in an online engagement.

The findings of this study would be of significance to researchers in the field of educational technology as well as other fields of education by providing them with empirical evidence in the use of social media for teaching and learning. It would also serve as an avenue that will lead to more researches in the field of social media enhanced learning with the ultimate aim of simplifying learning as well as making it more interesting, flexible, interactive and engaging in a learner-centred way. It would add more literature to the field of social media learning whereby it can continuously be empirically carried out in different settings, conditions and geographies with the ultimate aim of improving teaching and learning effectively.

1.7 Scope of the Study

The study was limited to the effect of Telegram and WhatsApp-enhanced instruction in collaborative learning settings on learning outcomes in micro-teaching among undergraduates in Gombe State. The study was limited to two Universities in Gombe State: Federal University Kashere and Gombe State University. The topics treated included micro-teaching concepts, teaching-learning concepts, instructional objectives, lesson plan, instructional resources, and classroom communication which were drawn from the faculty handbook of the various schools. The study was conducted on 300 level undergraduate students of 2020/2021 academic session. The primary independent variable of the study was social media at two levels: WhatsApp and Telegram, while the dependent

variables comprised of achievement, retention and collaboration. The moderating variable was gender. The study lasted for eight weeks.

1.8 Operational Definition of Terms

The following terms were defined for the purpose of this study:

Achievement: Achievement signifies the outcome of learning, having exposed microteaching students to a particular treatment using telegram and WhatsApp.

Collaborative Learning: This is a type of learning where micro-teaching students learn together in groups or as individuals through interaction, imitation, observation and engagement.

Learning Outcomes: This describes the level of achievement and retention exhibited by micro-teaching students after online engagement on WhatsApp and Telegram. **Micro-teaching:** This is a simulated teaching where undergraduate micro-teaching students demonstrate their teaching abilities before experienced teachers in order to be assessed and corrected.

Retention: This is the ability of micro-teaching students to learn facts to memory. It is the ability of micro-teaching students to reproduce what has been learnt on Telegram and WhatsApp platform.

Social Media: These are online platforms that allow micro-teaching students to interact, engage and exchange ideas amongst themselves and with their lecturers.

Student-teachers: These are the various undergraduate students offering microteaching that are enrolled in the teacher-education program under a long-term training to become professionals in future.

Telegram: This is a social media platform that offers micro-teaching students the opportunities to receive lesson contents online as well as interact with their colleagues and tutors.

Undergraduates: These are the various university students studying education in Gombe State.

WhatsApp: This is a social media platform that provides micro-teaching students with the ability to receive a variety of lesson contents while also interacting with their teachers and colleagues.

CHAPTER TWO

2.0 REVIEW OF RELATED LITERATURE

This chapter is a review of all relevant literature. It was carried out under these main categories:

2.1 Conceptual Framework

2.2 Theoretical Framework

2.3 Empirical Studies

2.4 Summary of Literature Reviewed

2.1 Conceptual Framework

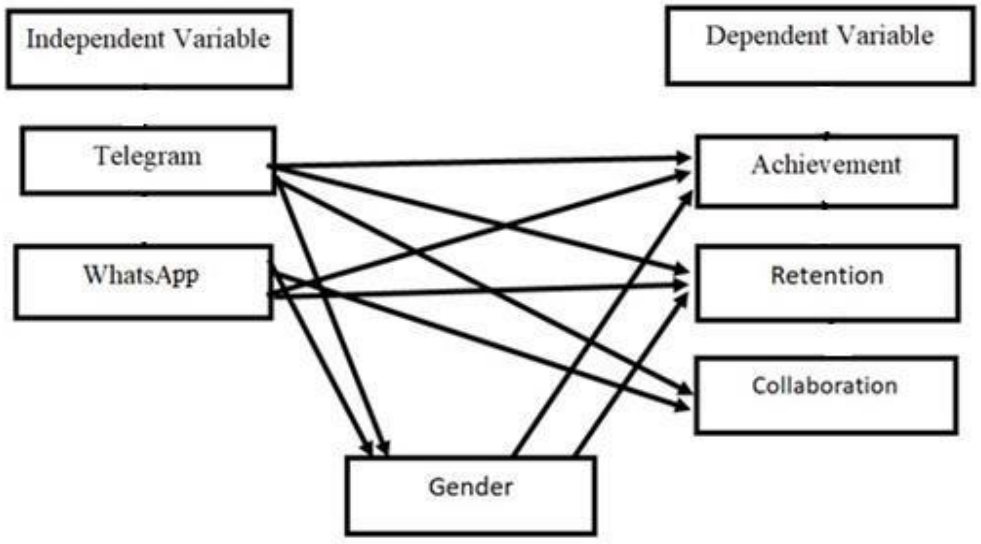

Figure 1: Conceptual framework

Figure one shows the schematic diagram of how the variables of the study interact with one another. From the figure, Telegram and WhatsApp, which are the levels of the primary independent variable, were used as experimental group I and II respectively. The dependent variables of the study are achievement, retention and collaboration. The independent variable (Telegram and WhatsApp) is expected to affect the dependent variable through achievement, retention and collaboration while gender is the moderating variable the primary and dependent variables.

2.1.1 The concept of information and communication technology (ICT)

Advancement in ICT has completely revolutionized the way and manner teaching and learning take place in various institutions today. Olafare *et al*. (2017) referred Information and Communication Technology (ICT) to mean a wide range of computerbased technologies like the internet, email and multi-media that are applied in the process of collecting, storing, editing, retrieving, and transferring of information in various forms in

order to meet personal and educational goals. Hence, based on this definition, ICT can be viewed as the knowledge, skills and abilities required in operating a wide range of technologies.

Alagu and Thanuskodi (2018) viewed ICT as an infusion of computers and telecommunications which offer exciting and innovative ways to provide learners with global access to information, lifelong learning and support. Over the years, ICT has been integrated into almost every human endeavour especially in the education sector. The advent of various ICT facilities has brought substantial changes in the educational system. This development has given birth to many investments in various kinds of ICT facilities in order to improve teaching and learning.

According to Aduwa and Iyamu (2019), ICT is a terminology that refers to the various technologies that are used for collecting, storing, editing and communicating information in various formats. It basically involves the use of computers and other electronic devices to process information. Aduwa and Iyamu (2019) observed that in our today's world which is ever changing due to massive technological advancements. ICT plays a very important role in the education sector as it is considered to be an important viable tool for the teacher as well as students during the effective implementation of curriculum contents. Teaching and learning may be influenced by diverse factors, and one of such factors entails the deployment of modern technologies to create conducive learning environments for students. ICT provides excellent infrastructure to deliver knowledge in various ways and systems as well as in different regions with different learners irrespective of location and time (Mellati & Khademi, 2018). The use of computer technology in the education sector for effective teaching and learning helps students to gain a level of competence in applying information technology to every day problem-solving. Therefore, educationists who are at the heart of the education sector must play a central role in leveraging the advancement in

technology, particularly ICT devices, in teaching and learning. Advancement in ICT continues to grow and expand, which serves as a means of interaction between lecturers and students and among groups of students through online chats and instant messages backed up by mobile technology (Olafare *et al.*, 2017).

The smooth integration of ICT into teaching and learning has been the major focus of 21st century education worldwide. The application of technology in classroom environment continues to play a vital role in enhancing effective teaching and enriching learning (Falode, 2018). The integration of ICT in teaching and learning entails the manipulation of various hardware and software applications. Over the years, the education sector has experienced a staggering implementation of ICT as an integral part of teaching and learning process as well as to cater for other educational needs.

2.1.2 The concept of social media

Social media are a public web-based service that permit users to create a personal profile, identify other friends on the same site, read and reply to postings made by other users on the spot, send and receive messages either privately or publicly (Boyd & Ellison, 2007). Social media are a website built technology that allows individual or group of individuals to express themselves and interact socially with others. This definition aptly captures all the activities that happen in the classroom whereby there is an active communication between students and their teachers.

Social media are characterized as web 2.0 e-learning resources which usually emphasize active participation, connectivity, collaboration and sharing of knowledge and ideas among different users (Muniasamy *et al.*, 2015). Social media as interactive platforms provide a medium of engagement within an online framework through the utilization of

social media sites that enable university students to share experiences and collaborate on relevant topics (Liccardi *et al.*, 2013).

Kaplan and Haenlein (2010) defined social media as an internet based applications that allow the creation and exchange of content which is usually user generated. They noted that social media was first known in 1979, when Tom Truscott and Jim Ellis from Duke University created the usenet, a worldwide discussion system that allowed internet users to post public messages; and also when Bruce and Susan Abelson, in 1998 founded the Open Diary. Open Diary was an early social networking site in which members of a certain community shared their daily diary online and the word "blog" was first used at the same time. Before the second stage of the development of the Internet (Web 2.0) in the late 1990s, users browsed only for the aim of getting information through reading from various resources and watching videos (Kaplan & Haenlein, 2010).

Yeboah and Ewur (2014) viewed social media as forms of electronic communication through which users interact among people in which they create, freely share, exchange and discuss information, ideas, personal messages, and other content about each other and their lives using a multimedia mix of personal words, pictures, videos and audio, utilizing online platforms while they are connected to the Internet. Social media is therefore seen as virtual platforms for interactivity and information exchange, where issues are debated and defined and where users collaborate in content creation.

Ghobadi and Taki (2018) defined social media as an internet application-based group built on the foundation of web 2.0 technology, which facilitates various content creations. Social media are frequently used by this generation for communication. In addition, they also use to create content in various fields such as motivational video content, inspirational

image content, and even educational content. Moreover, social media build the minds of users to be more creative in communicating and sharing ideas about anything on social media.

Hakim (2019) viewed social media as a group of internet-based applications built on the ideological and technological foundations of Web 2.0, which allow for the creation and exchange of contents that are user-generated. Social media are a form of electronic communication channels such as websites for social networking and microblogging through which users create online communities in order to share information, ideas, personal messages, and other contents. One of the advantages of social media learning platforms is the fact that even those students that are introvert can freely express themselves in writing unlike in situations where they had to talk before everyone in the class. The social media that are widely used by the younger generation are WhatsApp, Instagram, Telegram, etc. These applications are not only used to communicate with each other, they are also used in other needs like business and education (Hakim, 2019).

Although social media can be used for many purposes ranging from digital communication, marketing, social interaction, entertainment among others, whereby people have groups, over the years, the platform has been utilized by teachers to teach students in the form of a blended learning that supports the normal classroom activities. Dunn (2013) stated that social media platforms are as important as the learning objectives and they can promote interactive learning and foster collaboration. The new trend of social media learning has made learning to be flexible and interactive, thereby fostering communication between students as well as their teachers. Furthermore, factors like easy access, convenience, flexibility, easy to use and operate, have led to massive use of social

media worldwide. Teachers, therefore, are not left behind in this trend of technological revolution.

Social media have become one of the most important communication channels recently. However, the communication channels provided by social media exist so as to provide interaction among people regardless of distance, thereby making it open for people easily share information, files in various formats, pictures, videos, create blogs and send messages, and conduct real-time conversations. These systems are referred to as social, simply because they allow interaction with people so easily and effectively. It also strengthens the ties between people of those systems. The favourite in the realm of internet sites are WhatsApp, Telegram, Facebook, Twitter and others. These websites and social forums are a way of communicating directly with other people socially and in media. They are playing a large and influential role in decision-making in the global world economically, politically, socially and educationally (Al-Rahimi & Othman 2013).

2.1.3 Social media and education

The proliferation of social media platforms has enabled teachers and students to capitalise on them for not only interactive and communication processes but to foster teaching and learning. Teachers now design and deliver lessons at their convenience via various social media platforms while their students follow either asynchronously or synchronously as the case may be. Integrating social media in education is becoming an important part of teaching and learning process today. These various platforms enable students and teachers to engage in collaborative learning, networking, generate knowledge and share vital information that can be used to foster teaching and learning. Social media allow students to learn in peers through groups, live sessions and other engagements which improve their skills and knowledge (Mohammed & Ibrahim, 2020).

Social media have a critical role in facilitating learning and engagement of students and others in the learning process. Social media are very vital in education today because they provide a medium of connections with teachers and learners from different locations and outside specified class times, they also provide interaction with groups outside the class such as other students at different levels of education (Chandra and Watters, 2012; DeGennaro, 2008). Another important attribute of social media in education today is that they encourage active collaboration amongst students as well as their teachers where knowledge and skills can be enhanced (Liu *et al.*, 2011).

Additionally, Hastie *et al.* (2010) stressed that researchers can leverage on social media to provide feedback and support to peers, and to share activities with a large audience even beyond their tutors. Chandra and Watters (2012) noted that the active interactions between teachers and students through social media channels encourage those who might not normally do so in normal classroom session to actively participate in discussions. Hence, through blogs and other social media platforms, interaction is highly encouraged and easily made possible.

Mohammed and Ibrahim (2020) have highlighted the importance of social media in education, which include:

1. Social media offer multi-sensory approaches to classroom instruction for they appeal to various human senses of sight and hearing during classroom instruction. Instead of learning being more of orals talks, social media provide an avenue that makes learning to be practical, interesting and visual as the case may be. They also give students the room to learn from different perspectives unlike normal classroom session.

2. Social media foster collaborative learning in the sense that it provides an avenue for student-student or student-teacher interaction especially about issues relating to their class. In this case, students can interact and exchange ideas and facts amongst themselves and with their teachers. Students that are introvert during normal classroom interaction can express themselves on social media. Through collaboration, they can coordinate and assist one another to accomplish a task, assignment, project, online tutorials etc. that gives teachers ample time to concentrate on other things.

3. Social media increase the communication skills of students especially those that are timid in the classroom. Students improve their communication skills and abstract concepts become more concrete through interactions with peers and teachers especially when concepts are presented in the form of multimedia.
4. Social media boost research opportunities for students can connect and interact with prospective researchers, experts and supervisors even before commencing a program. Students can reach out to supervisors and other researchers through direct messages, emails, and other engagements to seek for more clarification and information regarding information they need. In addition, researchers can use social media to extract secondary data from polls, comments and other analytics that simplify data gathering techniques.

5. Social media platforms are so flexible that they make learning interesting and continuous at any given time. Teachers and students can schedule classes either synchronously or asynchronously and it can happen anywhere and anytime since students are always glued to their phones and gadgets. Teachers that are busy can schedule classes at a suitable time with their students. It is so flexible that classroom session can be extended beyond normal period; teachers can go live

where students will be able to join the conversation and comment while teaching goes on.

6. Through social media, teachers can send links to blogs and other virtual libraries which can be of tremendous help to students. Teachers can drop links to their works, textbooks, materials where students will be able to access in different formats.

Social media enable learners to interactively connect with their teachers and students regarding assignments, projects, research, tutorials to mention but a few. As a result, students who have difficulties in expressing themselves in normal classroom settings will freely do so while interacting on social media by posting questions that will require responses by everyone. Devi *et al.* (2019) opined that social media can be deployed as an effective tool for education purpose due to its ease of use, availability and affordability which provide students with the necessary knowledge and skills needed for the 21st century education. Many social media platforms have been used to facilitate online discussions and lectures, while others are used to enhance teaching and learning beyond classrooms.

2.1.4 The concept of telegram as a social media platform

Telegram is one of the web-based applications serving a large online community, which was launched in 2013 by two Russian brothers, Pavel and Nikolai Durov, an entrepreneur and a computer programmer, based in Berlin. One of the benefits of Telegram is the sticker shop, which is a collection of funny images that can be used in chats besides text. Through Telegram, you can share various document types than WhatsApp (Shima & Saeed, 2018). With Telegram, one can send messages, photos, videos, and files of any format as well as

create groups of up to 200,000 people. The platform also enables the creation of channels where individuals can subscribe to a particular area of interest and follow for update.

Telegram does not require phone numbers as you can easily add someone via their usernames. With Telegram, it is easy to follow up discussions using hash tags and mentions. Telegram is a multiple platform app that can run on Android, iOS, Windows Phone, Mac and Windows operating system. Moreover, the Telegram account can be accessed from multiple devices, even at a given time and messages appear

simultaneously on all devices (Ebrahimi *et al.*, 2016).

Azman *et al.* (2018) defined Telegram as a mobile application which enables people to communicate by using mobile phones, tablets or computers. Its friendly and easy-access traits have made it among a popular communicative application that has been used as compared to the competitor, WhatsApp, Telegram has additional traits of transferring and receiving documents and files without needing to store it into the device being used and also not taking our device storage. They highlighted that the contents and files in Telegram are stored in Cloud. Hence, larger files transfer could be done at ease compared to the other applications. Telegram is a cloud-based messenger and one can access messages from several devices at once, including tablets and computers where a number of files, documents, videos, pictures, and mp3 contents of up to 2.0 gigabyte can be sent. In a situation you don't want to save it on your phone due to lack of storage, you can save them on your cloud. Apart from its free accessibility, it is indeed a great platform to be used by both teachers and learners. Heba (2015) further explained that Telegram provides high security as it is using encryption technique in setting the privacy and security. In addition to that, it also does not include any advertisement that could cause interference in having

effective communication. Students can also make audio and video calls which make collaboration very easy and interesting.

Telegram as a mobile application allows users to communicate using mobile gadget and computer. It is a social media platform that allows users to interact with one another to exchange ideas and network. Telegram is one of the emerging platforms that offer both synchronous and asynchronous service to students where everyone can learn online and interact with the teachers and students.

With the stated overview of the platform, it can be seen that Telegram can be useful in teaching micro-teaching where documents of all formats and up to 2 gigabyte can be sent to students. Additionally, it offers both a synchronous and asynchronous service meaning that teachers can, when opportune, communicate live with their students based on an agreed time and drop contents intermittently where everyone will come across them at their own convenient time. The platform enables users to edit messages and review previous history of the group chat. Important group discuss can be pinned on the wall to enable students to concentrate. This is very useful as every topic can be pinned for a week to enable students to actively engage in the discussion.

2.1.5 The concept of whatsapp as a social media platform

WhatsApp is a free instant messaging application that allows the exchange of information in different formats for easy and effective communication. Sonia and Rawekar (2017) defined WhatsApp as a free messenger application which works on various platforms like iphone and android systems and it is largely used to send multimedia contents like photos, videos, audio, and other instant messages in the form of text. WhatsApp can therefore be used for teaching and learning through the creation of online groups aimed at fostering

communication with students, creating dialogue and encourage students to exchange ideas and information among themselves.

WhatsApp as a simple social networking platform is one of the largest social media platforms in the world often used for many purposes by a wide range of users. The WhatsApp platform allows users to deliver messages to the people individually or by creating group for a wider interaction. This application makes use of the Smartphone's online internet connection to permit the people to send and receive messages, images, videos and voice messages to the others. It can be used either synchronously or asynchronously. Amry (2014) noted that WhatsApp messenger is a mobile application that employs users' existing internet data plan to help them network with others. It is used for sending and receiving messages, video and audio messages. The auhthor added that WhatsApp these days had spread mostly among young people who are students and other artisans; it is mostly used as an entertainment and funny tool. They largely depend on it to know a lot of news around the world.

According to Yeboah and Ewur (2014), WhatsApp was founded in 2009 by former employees of yahoo known as Jan Koum and Brian Acton. WhatsApp is one technology that is mostly used on specific mobile phones and computers. Ever since smart phones became popular, many messaging services were launched, but WhatsApp has become very popular among them. WhatsApp Incorporation is based in Mountain View, California, United States and it was acquired by Facebook in 2014. WhatsApp provides online users with the ability to send and receive a variety of media, such as images, videos and audio media messages. WhatsApp has played a fundamental role recently and has been investigated in experimental studies.

WhatsApp may influence and raise levels of physiological activity in students in order to teach and learn more effectively since it may remove the physical barriers of the face-to-face classroom and to enable them to get into connection with one another outside the classroom. WhatsApp has become a service that enables individuals, businesses, schools and government agencies to share information from diverse sources and this service has quickly shifted the way people communicate (Susilo, 2014). It may be noted that this service is one of the evolutions that have been frequently utilized on mobile phones and other devices (Yeboah & Ewur, 2014).

As a unique, instant messaging subscription service used on different types of computers or with different software packages which are placed on the new generation of smart of phones, WhatsApp permits its users to send free text messages to each other. It should be pointed out that various message types such as audio files, pictures, and videos are supported by WhatsApp (Alsaleem, 2014). Among social networks rapidly gaining ground, WhatsApp is coming forth as a tool that can be utilized for different educational aims. WhatsApp is already being utilized to instruct the body of words or to spread general information and links for language learning widely.

WhatsApp application runs identically on different platforms and it can be installed on different types of smart phones such as iPhone and Android. It allows mobile phone users to send free messages to each other via internet. These users can also share images, audio files, and videos. WhatsApp provides an option to create a group of users who can communicate among each other. The user that brings the group into existence on WhatsApp is its manager.

WhatsApp messenger uses the same internet data plan as emailing and web browsing and there is no extra charge for messaging and staying in touch with others. In addition to basic

messaging, another important feature of the WhatsApp is the Offline messaging. It means that all messages transmitted when the device is off or when it is located outside the coverage area are automatically saved and retrievable when network coverage is restored or when the device is turned on (Bere, 2012). Finally, WhatsApp works via phone numbers and integrates with users' address books, thus there is no need to memorize usernames or passwords.

2.1.6 Telegram as a medium of effective instructional delivery

Telegram as a social network is becoming one of the major tools for education especially in the aspect of social media learning. The rapid development and enormous advancement in computer technologies have been affecting all aspects of life for more than three decades. Moreover, studies found a positive association between the use of internet and social media and academic performance of the students. Students using internet frequently, scored higher grades (Hakim, 2019).

Integrating Telegram channels into existing learning practices can provide an interactive, flexible learning where students can learn new things and perfect some skills especially in micro-teaching. Denysiuk *et al.* (2018) labelled instruction on Telegram to be learner-centred method where learners have unlimited access to information. By learning on Telegram, the interactions with peers and teachers can be maximized and this promotes better learning compared to a traditional classroom situation.

Telegram gives the ability to send disappearing messages and photos much like another popular app. Within a secret chat, documents, videos, locations and searched image can all be shared which last from two seconds from up to a week. The application rides it sides

on its enhanced security, which it attributes to time-tested algorithms that combine security with high-speed delivery and reliability (Williams, 2014).

Adesope and Nwaizugbu (2018) identified some benefits of Telegram for teaching and learning to include:

1. Privacy: Several tests confirmed that Telegram is the safer application in the market. Everything is encrypted from the chat to the calls.

2. Cloud and security: Every conversation and content is saved in the cloud. Therefore, no loss of anything due to a device formatting or change.

3. Password protected conversation: No more messages read by strangers' and unwanted users.

4. It makes students chat with any one: students can communicate with someone by just searching them through their usernames and not necessarily through the phone number saved in their contact list.

5. The power of groups: Telegram allows students to create super groups with huge numbers that could rise up to 200,000. And with possible future updates, they will become even much bigger.

As a student-centred asynchronous platform, Telegram is considered as a great teaching platform that uses online learning resources to facilitate information sharing outside the constraints of time and place among a network of people. Asynchronous learning is based on a student-centred approach that emphasizes the importance of peer-to-peer interactions. This approach combines self-study with asynchronous interactions to promote learning, and it can be used to facilitate

learning in traditional on-campus education, distance education and continuing education (Adesope & Nwaizugbu, 2018).

In a similar regards, Hakim (2019) also highlighted some of the key features that make Telegram very useful especially in teaching and learning. These features include:

1. Safety and security: Telegram ensures the cyber security of users since messages are encrypted and the app has the capability of self-destruction, the secret chats can be self-destructed without any interference. This allows learners to be more extrovert and cooperative in doing the tasks because users should no longer be worried about the mistakes they might make since the exchanged messages can be easily rectified. This allows learners to express themselves freely because the messages can be corrected at any time.

2. Access to channels and group: Telegram users have access to a wide variety of channels and groups. The channels and groups can either be searched or accessed by having an invitation link. Unlike some other virtual societies and websites, access to channels, discussion groups, and online classes can be made much easier with a little search about the topic of interest. Moreover, joining channels and groups is free of any premium charges. Every teacher or learner can construct their own channels and groups and invite their students to start interacting in an online environment.

3. The seamless network: It is possible to use Telegram on different devices simultaneously, for example, on both a smartphone and a laptop. This helps the continuation flow of getting the information from different resources without

any interruption. In other words, a learner can start getting the information on their laptop and continue doing so on their mobile phone if they want to get out of the house.

4. Telegram has the capability of supporting all file formats including extensions and size. This is very important for distance language learning since teachers and learners need a robust and dynamic environment to send and receive files with different extensions. Moreover, there is no restriction over the size of files which are exchanged. Files up to two gigabyte (2GB) can be exchanged in any discussion forum. Selecting a file from the gallery or saving a file to the hardware requires a single touch or click. For example, the teacher can send a multimedia file with any extension and upload it to a group. All group members can download it for free and share their opinions about it. Learners can also express their own opinions by sharing files. All this maximizes interaction among learners and encourages them to do the tasks collaboratively. Telegram is a versatile multifunctional online application, with its channels and groups catering for most purposes of their users. Every individual user can create unlimited groups for up to 200,000 members and channels with an unlimited number of members. A group is a combination of email service, text messaging app, multimedia messaging app, online forum discussion, and systematic educational robots. Therefore, it can take care of personal, educational, and business needs all at the same time. Once the members are added to a group, they can be guided by the admin users of the group (usually the online

instructors or the researchers and their assistants) to accept the rules of the group. Depending on the purpose of the group, members are briefed on how to make use of the presented materials within an already determined framework.

5. Assigning tasks to learners: By using a group, a wide range of meaningful and challenging tasks can be presented to learners. The application endorses podcasts from a wide range of domains. Some video podcasts for teaching various related to micro-teaching concepts can be taught.

One of the main advantages of Telegram is to foster collaborative learning, and ease some of the burden on teachers thereby making learning flexible, interactive, and interesting. As a result, Chang and Hsu (2011) stated that learners, in a collaborative learning environment, could help each other without any inhibitory feeling. Moreover, they could be engaged in different features of the app for many hours and it was a wonderful tool to develop learner-centred pedagogy. In addition, the application provides an opportunity for instructors to continuously monitor the learners' progress.

2.1.7 WhatsApp as an effective tool for interactive instructional delivery

WhatsApp platform exchanges billions of messages on a daily basis. In June 2013, WhatsApp proclaimed that they received twenty-seven billion messages in twenty-four hours (Amry, 2014). Over the years, the platform has been used by many researchers as a means of enhancing classroom instruction as well as encouraging collaboration not only amongst students but teachers as well. WhatsApp as an emerging learning platform is so flexible that educational contents can be dropped at any time by the tutor and in different formats. With WhatsApp, you can create multiple groups with total participants of up to two hundred and fifty six people (256) with various admins carrying out different roles. This simplifies teaching and also encourages students to learn at their own convenient time.

WhatsApp assists instructors in saving time and managing more effectively the classroom as well as keeping students informed with the latest classroom activities.

WhatsApp learning platform supports active learning and improves high communication. The WhatsApp platform has some important features that enable smooth connection with peers, which will promote mutual influence amongst students and tutors. The collaborative learning that happens in WhatsApp groups enables students to have sense of being a member of a learning community, and this makes them to consider tasks more seriously since their contributions in a WhatsApp group are overt (Sweeny, 2010). Bawa and Ibrahim (2016) noted that WhatsApp enhances

collaborative learning of students, thereby increasing their performance significantly.

Barhoumi (2015) mentioned some of the general benefits of using WhatsApp instant messaging during an online classroom interaction:

1. WhatsApp instant messaging facilitates online collaboration and cooperation between online students connected from school or home in a blended mobile

   lecture.
2. WhatsApp is a free application that is easy to use.
3. Groups connected to WhatsApp instant massaging can share learning objects easily through comments, texts and messaging. Discussions are related to the course content taught in class.

4. WhatsApp provides students with the ability to create a class publication and thereby publish their work in the group.

5. Information and knowledge are easily constructed and shared through WhatsApp instant messaging.

WhatsApp offers a two-way communication process and this enables the smooth exchange of information amongst students and tutors in an online class. Teachers can therefore send assignments or course contents where students are expected to respond positively. Cetinkaya (2017) observed that WhatsApp is now an effective way of increasing the success of teaching and learning because it makes students to develop a

positive attitude towards their various courses. This is due to the fact that students can conveniently decide when to respond depending on their time schedule. WhatsApp incorporates the use of multimedia contents where pictures, audio, videos, graphics, and texts can be used to support normal conventional classes. With the multimedia contents being able to stimulate both auditory and visual senses, teaching and learning can be effectively enhanced. The voice note feature helps teachers to clarify things and even send audio contents in a situation they are busy to type. Discussion forums like WhatsApp provide online students with opportunities to collaborate and cooperate in order to construct knowledge. This simply means that teachers, as facilitators of knowledge, can pose a question or an assignment that requires the active collaboration of each student in order to increase their understanding. This will help the students to understand concepts better, thereby enhancing their performance.

Additionally, Ofoka (2019) added that WhatsApp learning platform enhances communication as well as active engagement of students when it comes to teaching and learning. It provides a medium through which teachers can discuss with students, and for everyone to participate including the introvert. This therefore boosts their confidence and engagement unlike during normal classroom session. This view was corroborated by Bere (2012) who found that students' engagement in WhatsApp groups promote their participation in spontaneous discussions and raised their self-confidence thanks to the availability of anonymous identity in the platform.

As a result of the foregoing discuss, WhatsApp is an important platform that can be used to teach students because it makes learning interesting as well as collaborative. Students who cannot confidently be involved in the physical class will definitely be involved in the

online asynchronous platform. Teachers must therefore, as facilitators of knowledge incorporate the use of WhatsApp platforms towards effective delivery of lessons.

2.1.8 The concept of collaborative learning

Collaborative learning is defined by Dilenbourg (1999) as a situation in which two or more people learn or attempt to learn something together. This can occur in the form of groups or as individuals. The elements of the definition was broken down by Alkhathlan and Al-Daraiseh (2017) and can be interpreted in multiple ways: the first element "Two or more" can either be in the form of pair, small groups of three to five subjects, a class of about 30 subjects as a maximum, a community of hundreds or thousands of subjects, or a society of millions of people or subjects; learning as the second element of the definition refers to as any collaborative activity in an educational context like learning a course or a course material, practicing learning activities such as problem-solving, or learning from the lifelong work expertise; lastly, the third element "Together" involves various forms of interactions such as face-to-face, computer-meditated instruction, synchronous, time frequent or not. Al-Rahmi and Othman (2013) observed that in a typical social media collaborative setting, students are able to learn well by engaging in group and individual discussions, retain information, and develop a positive attitude towards working with one another.

Van Boxtel *et al.* (2000) opined that collaborative learning activities allow students to provide explanations of their own understanding which can in turn help them, through interaction, to elaborate and revise their knowledge. Learning through collaboration significantly improves students' understanding of concepts because concepts are usually discussed from a wide range of perspectives. Lai (2010) observed that collaborative learning helps low-achieving students who, on a normal day, find it difficult to express

themselves under normal circumstances. However, through collaboration, they interact with their peers freely.

Julius (2018) identified some principles of collaborative learning that a teacher can engage students on. They include:

1. The learner is the central focus of any instruction.
2. Interaction and participation are of primary importance when it comes to collaboration.
3. Working in groups is an important mode of learning.
4. Structured approaches to developing solutions to real-world problems should be incorporated in learning.

From the stated principles, it can be noted that collaboration is strictly a learner-centred approach where students specifically interact in small groups in order to exchange ideas and learn concepts. The teachers, therefore, in this process are facilitators of knowledge who set the ground running and monitor as students collaborate based on assigned task and roles.

Collaborative learning is one of the most important learner-centred approaches of teaching and learning where the students are allowed to engage in group discussions based on their individual capacities in order to enhance their learning. Under this method, students are free to assign roles to themselves as well as even form study groups that are engaged in tutorials and other peer-tutored teaching. The teachers, in this method, are facilitators, where they observe the procedure and effect corrections in areas they so wish. According to Williams and Augustine (2015), collaborative learning is very essential in teaching and learning because it encourages learners' active engagement in the learning process when

they are usually involved in searching, finding and evaluating information from a variety of sources such as peers, teachers and the wider society to increase their knowledge; thus becoming accountable and responsible for the successful achievement of their own learning outcome and that of others.

Collaborative learning, as observed by Srinivas (2014), is based on the idea that learning is a naturally social act in which the participants talk among themselves. It therefore means that learners need a social environment where they will interact, communicate, share and construct knowledge with peers for effective learning to take place. Under the collaborative learning environment, students are challenged to participate because they listen to different perspectives, and are required to articulate and defend their ideas. Collaborative learning which is embedded from primary schools to tertiary level institutions is among the most explored learning method in the 21st century according to Mahbib *et al*. (2017). Collaborative learning is an acceptable method of teaching and learning where students work together in groups to create, complete and enhance given tasks. Students in a social media collaborative learning environment exploits smart devices to collaborate typically in informal learning outside of normal classroom or instructor supervision.

Collaborative social media platforms like Telegram and WhatsApp have been frequently used over the years to encourage active participation in classroom learning. Under this system, students interact asynchronously with their colleagues as well as tutors in order to exchange ideas and get in contact with course contents. The social media collaborative platform supports a wide range of documents where learning contexts in the form of multimedia can be dropped for students to download and read. One of the major advantages of social media collaboration is that feedback can be given immediately.

Online collaboration allows the collection of data for comparison, discussion, analysis and feedback of knowledge among students. This is an effective way to obtain experimental data that demonstrates the power of technology in group projects which generate reports of its practices (Luna & Sequera, 2015). Udenze and Oshionebo (2020) stated that when students learn together with their colleagues in discussion settings like the various social media platforms that usually provide group solving tasks or learning contents, they are considered to be part of a collaborative learning environment.

Collaborative learning occurs when students and teachers work together to create knowledge. It is a teaching strategy on the basis that students create meaning together and that the process enriches and makes them grow. Collaboration in small groups has been particularly recognised as both advantageous and appreciated by students. It has been shown that small groups enable students to identify and correct misconceptions more easily and quickly and to improve understanding of the topics being studied (Gaytan & McEwen, 2007). In addition, small groups are considered as more suitable for group discussions and equal contribution of group members (Finegold & Cooke, 2006). Springer *et al.* (1999) found that small groups provide students with a better learning experience and ultimately greater academic achievement, whereas Brindley *et al*. (2009) reported that students often prefer working in small teams over large study groups.

It is important for learners to collaborate because doing so contributes to deeper levels of comprehension and long-term retention. Learners who work closely with peers can benefit in a number of ways, including better academic results, more critical thinking, stronger relationships and greater psychological well-being (Johnson & Johnson, 1999). Furthermore, collaborative activities provide great opportunities to develop social and communication skills, thereby building strong group cohesion.

2.1.9 The concept of micro-teaching

Micro-teaching, like the name goes, is a small, simulated and regulated form of teaching aimed at perfecting the skills of student-teachers who are trained in the teachereducation program. Students, in this case, are closely monitored and observed by their tutors who, in some cases, video them for some few minutes and they are shown their lapses in order to make amendments in areas of weakness. Micro-teaching is an important aspect of teacher-education program because quality teachers are very vital when it comes to the implementation of any curriculum.

Goodland (2010) explained micro-teaching as a system of control practice that makes it possible to concentrate on specified teaching behaviour and to practice teaching under controlled conditions. Isa and Jusoff (2011) viewed micro-teaching as the ultimate sessions where the undergraduates put theories into practice. Classroom discussions are always abstract and theory. However, micro-teaching is an avenue for students to put what they are taught into practice. Furthermore, Egunjobi *et al.* (2011) described microteaching as a program that prepares student-teachers for the main teaching practice. They explained that micro-teaching is an indispensable course for student teachers to observe and acquire for teaching tasks.

According to Singh (2011), micro-teaching is a training technique whereby the teacher reviews a video tape of the lesson after each session, in order to conduct a “post mort”. In the process, teachers find out what has worked, which aspect has fallen short, and what needs to be done to enhance their teaching techniques.

Ajileye (2013) observed that micro-teaching is a session of practice teaching that is videotaped for the teacher to watch. Micro-teaching is suitable for potential, new and existing teachers to review their teaching techniques and receive feedback from fellow

teachers and administrators. The feedback received is used for making corrections to their teaching style accordingly. As every human activity or behaviour is geared towards achieving a purpose so also, micro-teaching has aim, goals and objectives. Micro-teaching as an innovation in education has intention is for training pre-service teachers in skills acquisition so as to make them effective and professional. It is a procedure in which a student-teacher practices teaching with a reduced number of pupils in a reduced period of time with emphasis on a narrow and specific teaching skill. It is a scale down teaching encounter in class size and time.

In a micro-teaching settings, the given teaching skill is illustrated by the course lecturer and or a video-tape or films is shown of teachers using the skill in micro-teaching or in normal classroom teaching, with a commentary drawing attention to specific instances of the teachers' use of the skill. The trainee teaches it to a small group of pupils, and the lesson is usually videotaped. A critique session is held in which the micro lesson is analysed, with the help of feedback from various sources.

In this aspect of teaching, a trained student picks a topic and makes lesson preparation in terms of content, delivery method, instructional materials, statement of objectives, evaluation activities and a host of others that are part of lesson delivery. The supervisor and some other students contribute at the end. Micro-teaching is used for the development of new teaching skills and refinement of old ones. Teaching skills can be referred to as specific teacher behaviour designed to enhance the effectiveness of classroom instruction (Sana, 2007).

One of the major aims of Micro-teaching or training programme as noted by Garba

(2018) is to modify teachers' behaviour according to the specific objectives. It is a process of subjecting human behaviour to 5Rs of video tape recording, reviewing, responding, refining and re-joining. It is a controlled practice that makes it possible to concentrate on teaching behaviour in the student-teacher training.

From the foregoing, it can be seen that micro-teaching entails a simulated classroom teaching whereby students showcase what they have been taught in the classroom. It entails putting all the theories learnt in the classroom into practice. In some cases, the teaching is often recorded while the students are on with their session in order to enable them see their areas of strength and weakness in order to make amends. Sometimes, a session is held where students are corrected where necessary. Micro-teaching is an important aspect of teacher-education given its relevance and importance towards the production of qualified teachers.

2.1.10 The role of micro-teaching in teachers' development

With micro-teaching, student-teachers find opportunities to develop skills in drawing learners' attention, asking questions, using and managing time effectively and bringing the lesson to a conclusion. In addition, through micro-teaching, the teachers' class management skills improve. They acquire the skills to choose appropriate learner activities, use teaching materials and overcome difficulties encountered during the process. On the other hand, the student-teachers can also improve their skills in giving feedback and measurement and evaluation. Furthermore, by observing the presentation of their friends, they find a chance to evaluate different teaching strategies (Abdurrahman, 2010). Quality teachers are best obtained via effective teacher education where micro-teaching forms one of the vital aspects as contained in the teacher training curriculum.

Therefore, micro-teaching, according to Audu (2010), is relevant to teacher education programme because of the following reasons:

1. Most teachers initially are in short of skills of teaching and also find it difficult to apply the skills. Micro-teaching empowers them with adequate skills in teaching to enable them carry out their duty effectively.

2. Micro-teaching helps teachers to acquire actual training experience in that it enables the teachers to develop their existing basic skills.

3. Micro-teaching is relevant in teacher education because it makes the teacher realize that even though he is experienced in the job, he still has some instructional weaknesses and it gives him that feeling that there is room for improvement.

4. The actual experience of classroom teaching does not enable teachers to develop and improve on the basic skills of teaching. Micro-teaching program provides an opportunity for teachers to develop and improve on some of the basic skills of teaching.

5. Micro-teaching prevents student-teachers from acquiring teaching skills by trial and error as in block teaching, but rather it helps, teachers to perfect and acquire new skills.

6. Micro-teaching provides an opportunity for teacher trainees to be involved in actual teaching early in their training and to practice teaching in a conducive setting.

Micro-teaching also improves teaching competency. Student-teachers learn by observation, oral and audio-visual feedback of peers and supervisors. Teacher educators get their students motivated; learning skills together and appreciating feedback. This has

made students practice teaching, before actually going to practice i.e. at least two skills are practiced before entering the classroom. This mode of training increases the confidence level in student-teachers which in turn has positive impact on learners in the classrooms.

2.1.11 Objectives of micro-teaching in teacher education program

Teacher education is the special training that is meant for teachers and teaching profession. One of the components of teacher education program is practice. Before student teachers are thrown to the normal classroom for teaching practice, they undergo micro-teaching which equips them for acquisition of teaching skills (Ajileye, 2013). Ambili (2013) identified three phases of micro-teaching as knowledge acquisition phase, skill acquisition phase and transfer phase. The knowledge acquisition phase is described as pre-active phase. During knowledge acquisition, student teachers learn about the skills and their components through orientation, lectures, discussions, tutorials, illustrations and demonstration of the skills given by the experts. They learn about the purpose of the skill and condition under which it proves useful in the teaching-learning process. They learn a lot about the skills from the demonstration given by the experts.

The second phase as identified by Ajileye (2013) is the acquisition phase. It is the interactive phase when the student teachers are expected to plan micro-lesson on the basis of the demonstration presented by the experts. The student teachers practice the skills through the micro-teaching cycle and continue their efforts till they attain mastery level. The feedback component of micro-teaching contributes significantly towards the mastery level. The feedback is given to behavioural change of the teacher trainees in the desired direction. The last phase is the transfer stage of micro-teaching which can be referred to as the post-active phase. After attaining the mastery level and command over each of the

skills, the student teachers integrate all these skills and transfer to actual classroom teaching.

Micro-teaching enables student-teachers to learn and assimilate fresh teaching skills under controlled circumstances. It enables student teachers to master a number of teaching skills which increase their confidence and skills during the teaching and learning process. Micro-teaching is generally meant towards equipping pre-service teachers to gain confidence in teaching through master of skills on a small group of students. Gorgen (2003) stated that micro-teaching aimed at helping student teachers to gain confidence and research skills. Through micro-teaching, student teachers can gain pre-service and in-service teaching experiences and academic self-confidence.

Additionally, Audu and Agbo (2010) reported that micro-teaching objectives are designed to:

1. Provide students with an opportunity to develop their understanding of concept of the teacher as a reflective practitioner in a controlled and secure environment.

2. Continue the process of core skill acquisition through the process of guided planning, implementation and review of laboratory teaching practice case studies;

3. Motivate and instil confidence in the student teachers before they proceed on teaching practice in cooperative school.

4. Introduce students to contemporary approaches to positive discipline and effective classroom management.

5. Allow student engage in an initial period of guided school based teaching practice.

6. Allow students expand their analysis of the potential role to be played by ICTs in the development of core teaching competences.

7. Equip students with the ability to define, create and maintain effective learning environment.
8. Develop in the student teacher the ability to be analytical, critical and objective in self-assessment of his/her teaching which hopefully can be transferred to normal classroom situation in his/her school.

9. Assist the student-teacher to be well disposed to supervision and the supervisor who should be seen as a friend concerned with improving his/her skill as a teacher.

Therefore, in achieving the micro-teaching objectives, the student-teacher will require all the necessary and constant development in order to enhance their effectiveness and efficiency toward training the student-teachers. However, as good as these objectives sound, they can only be achieved only if adequate and persistent financial supports as well as the provision of the much needed facilities are put in place in ensuring a conducive environment for effective micro-teaching.

2.1.12 Emergence of micro-teaching in Nigeria

According to Ijeoma *et al.* (2014), micro-teaching emerged in the early and mid-1960s when Allen and his colleagues from the Stanford University established a training programme that was aimed at improving teaching effectiveness and efficiency. In that regards, Nzewi (1988) added that the Secondary Teacher Education Programme (STEP) at Stanford University launched a new form of collaborator teaching experience known as "Demonstration teaching". Allen and his group who led the laboratory experience and student-teachers were made to teach and their teaching was recorded. After the recordings

were analysed and discussed those specific skills they exhibited that made for effective teachers were identified and isolated. The student teachers were asked to practice each of the skills one after the other within a period of time in the presence of supervisors for constructive criticisms followed by a feedback and continuous practicing of a skill until it is mastered. They then named the approach where students would teach and their teachings are recorded as micro-teaching (Ananthakrishnan, 2002).

In Nigerian perspective, the history of micro-teaching traced back to Alvan Ikoku Federal College of Education Owerri (AICE), which is now a Federal College of Education. Chimezie (2000) noted that micro-teaching started in the College around 1974 during the United Nations Development Programme (UNDP)'s visitation report to the College in the early 70s. Alvan Ikoku College of Education was chosen as an innovative institution in Africa due to its place in the use of Micro-teaching for teacher training program. In 1973, the educational technology/micro-teaching laboratory was equipped by the UNESCO where they also sent foreign staff to work with some Nigerian staff. After some years of services, in 1976, UNESCO withdrew its staff because the UNDP/UNESCO technical assistance for Eastern Nigeria expired. The micro-teaching was managed by some lecturers in the institution that were trained in Nigeria and outside the country.

Ijeoma *et al.* (2014) confirmed that Alvan Ikoku College of Education was a great centre of excellence for teacher education programme in Nigeria and as a result of the quality of the output of the college, graduates from AICE were of high demand then. These practice spread from Alvan Ikoku to other colleges of education and universities in the country. In fact AICE is known in Africa because of micro-teaching and has always been acknowledged as the primus interpares among other teacher education institutions in Nigeria and Africa at large (Ohuche & Izuwah, 1988). In 2007, the federal government

took over the college and named it Alvan Ikoku Federal College of Education (AIFCE) and in 2013, the Federal government chose the institution among the two Nigerian institutions where modern micro-teaching laboratory will be built.

According to Chatzidimou (2011), micro-teaching plays a significant role in teachereducation programme and that it is still in fashion due to its importance. Adedapo (2013) stated that micro-teaching seems to have great potentials because it provides pre-service teachers with the opportunity to try their theoretical information in practical settings, which will enhance their confidence in their ability to teach.

Micro-teaching admittedly adds to the cognitive and affective skills of teaching and the psychomotor skills of practicing the "specific things" that make for effective teaching. This training equips the student-teachers professionally and teachers in general for qualitative and quantitative teaching and learning.

2.2 Theoretical Framework

Learning theories tell us about human behaviours with respect to teaching and learning. Learning itself is a change in behaviour as a result of an experience that has been learnt or mastered. This section deals with relevant learning theories that have relationship with the study. In this case, Bandura (1977)'s social learning theory as well as Vygotsky (1978)'s socio-cultural theory has been discussed, including how they are relevant to the study. The two theories present how people learn through interaction, imitation, observation and collaboration.

2.2.1 Social cognitive learning theory

The social cognitive learning theory of Albert Bandura proposes that people learn from one another through observation, imitation, and modelling. According to Bandura (1977),

people learn by observing what others do in terms of behaviour, attitudes, and outcome of that behaviour. The theory assumes that most learning takes place through behaviour modelling as a result of observing others. As students observe others do something, they form an idea of how fresh behaviours are performed. Bandura's social cognitive learning theory explains human behaviour in terms of continuous reciprocal interaction between cognitive, behavioural and environmental influences. Alkathlan and Al-Daraiseh (2017) observed that the social cognitive learning theory by Bandura (1977) stresses that learning is a social activity where individuals learn by interacting with each other and with the situated social environment in order to improve learning outcomes.

While summarising the main proponent of the theory, Bandura (1977) stated that learning would be very laborious, if note even hazardous, when people rely solely on the effects of their own actions to inform what they do. Interestingly, most human behaviour is always learned observationally through modelling. This modelling could be from observing others where one forms an idea of how new behaviours are performed, and on later occasions this coded information serves as a guide for new action.

According to Nabavi (2012), the social cognitive learning theory is based on the idea that we learn from our interactions with others in a social context. As a result of observing the behaviours of others, people tend to develop similar behaviours akin to the observed behaviour. After such an observation has been made about the behaviour, people assimilate and imitate that particular behaviour especially if the observed behaviours and experience are positive ones or they include a reward for action. The social cognitive learning theory, as observed by Muro and Jefferey (2008), has become one of the most important learning theories because it is rooted in many traditional theories of learning.

The theory is always referred to as a bridge between behaviourist and cognitive learning theories because it encompasses attention, memory, and motivation.

Newman and Newman (2007) noted that under the social learning theory, learning can take place under the following general principles: observation, imitation and modelling.
Based on the foregoing, therefore, Nabavi (2012) further identified observational learning to be one of the key concepts of the social learning theory that can be used in online social media settings. This concept comes to bear as a result of Bandura's famous 1961 experiment known as the Bobo doll experiment which studied the behavioural patterns of students in a social learning context. The result from the Bobo doll experiment changed the focus of psychologists from mere behaviour to cognition. According to Newman (2007), the children that participated in the study received no encouragement or incentives to beat up the doll; instead, they were just simply imitating the behaviour they observed. Bandura therefore named that behaviour of beating the doll by imitation as observational learning and characterised the elements of effective observational learning as attention, retention, reciprocation, and motivation. He therefore propounded that children learn and imitate behaviours they observed from others. As a result, Bandura identified three models of observational learning: a live model which involves an individual demonstrating or acting out behaviour; a verbal instructional model which involves descriptions and explanations of behaviour; a symbolic model which involves real or fictional display of behaviours in books, televisions, or online media.

From the discussions, it can be observed that learning can take place through imitation, observation, and modelling. All these affect behaviours in an attempt to bring about a good learning outcome. In a typical online collaborative setting, the idea is to foster interaction, discussion and behaviour change. This means that in a collaborative social environment,

learning actually takes place through observation of behaviour, modelling as well as imitation. The imitation can come in the form of student-student or studentteacher engagement. The online social media settings provide an avenue for students to discuss in groups and as individuals. While the discussion process is going on, students observe from the behaviours of their colleagues in the collaborative settings to improve their behaviour which is translated through increase in performance, retention and motivation. Furthermore, some students model their behaviour and keenly observe the behaviours of the teacher as well as their colleagues in order to enhance their learning through imitation of what they have observed just like Bandura's experiment showed. This is easily seen as learning is said to be a change in behaviour as a result of observation, experience and even imitation.

As students learn in an online setting, according to this theory, through imitation, observation, and modelling, interaction is highly enhanced because without interaction, learning cannot take place. Social media platforms like WhatsApp and Telegram provide students with an opportunity to learn and interact with one another as they observe from their peers and then try to reciprocate what they have observed in the process. This reciprocation of behaviour comes to bear as a result of imitation, repetition and discussion. The online social media settings is always filled up with contents and discussions and this can foster active engagement, interaction and behaviour change which, in this case, is described as learning.

2.2.2 Socio-cultural theory

Lev Vygotsky is a Russian psychologist that developed a cognitive theory in the early 20th century known as socio-cultural theory. The main postulation of the theory is that cognitive development is advanced through social interaction with others, especially those

who are more skilled. Socio-cultural theory is based on the social constructivist paradigm which stated that knowledge is constructed socially through interaction and shared by individuals. The theory describes learning and development as being embedded within social events and occurring as learners interact with other people, objects and events in a collaborative environment (Vygotsky, 1978).

According to Johnson (1999), socio-cultural theory describes human cognition as developed through engagement in social activities, as an individual interacts with other people, objects and events. As a result, human cognitive development cannot be divorced from social, cultural, and historical contexts from which such development emerge. John-Steiner and Mahn (1996) noted that learning and development occur in two ways: interaction with others and within the learner. Poly *et al.* (2020) observed that there are three themes in Vygotsky's idea of socio-cultural learning: human

development and learning originate in social, historical and cultural interactions; the use of psychological tools like language, mediated development of higher mental functions; learning occurs within zone of proximal development.

The socio-cultural theory has been adopted in the design of a collaborative learning environment which encourages active interaction between students either in small groups or as individuals. Knowledge in this theory is socially constructed through interaction between groups and individuals (Wang *et al.*, 2011). Vygotsky asserted that human thinking has social origin, and social interactions play a critical role especially in the development of higher order thinking skills, and cognitive development cannot be fully understood without putting into consideration the social and historical context in which it is embedded.

Vygotsky (1978) stated that every function in the child's cultural development appears twice: the social level as well as the individual level; the first one is between the people (interpersonal) and the second one is inside the child (intra-psychological). In essence, according to this theory, learning awakens a series of variety of internal developmental processes that are able to operate only when people interact with others in the environment and with their peers. In this case, he noted that learning is not only developmental, however, carefully organizing learning outcomes can result in mental development which sets in motion a variety of developmental processes that will be impossible apart from learning.

Rogoff (1990) referred to Vygotsky's theory as a process of guided participation where a learner actively acquires a new culturally valuable skills and capabilities as a result of meaningful, collaborative activity with an assisting, more experienced colleague. It is absolutely critical to notice that these culturally meditated functions are viewed as being embedded in socio-cultural activities rather than being self-contained.

Poly *et al.* (2020) stated that there are several ways technology can be used to support the use of social learning theories during classroom instruction through the use of current and emerging online collaborative spaces such as Google, Skype, wiki etc. as well as other classroom hands-on collaborative technology like tablets and ipads. With respect to this study, the use of social media learning platforms like Telegram and WhatsApp provide a high sense of collaboration among students as well as their teachers. It can be in the form of groups or individuals. The socio-cultural learning theory enables students to interact and engage in high level of collaboration through the use of technology. Through the use of social media platforms, students can be able to participate in active collaborative learning thereby making learning to be meaningful and participatory. This will enable

them to form meaning out of it on their own through peer interaction. Students, in this process, will learn from others and from the activities that take place thereby constructing meaning out of the entire process. The use of social media platforms provides a high level of collaboration and students can work in groups, as individuals, or simply by observing others in order to learn concepts.

2.3 Empirical Studies

This section dwells on past empirical studies that have been conducted with respect to this study. Empirical studies have been reviewed about Telegram and WhatsApp as well as collaborative learning. These empirical studies have data that were collected, validated and analysed by various researchers.

2.3.1 Empirical studies on telegram and academic achievement

Berenji and Saeidi (2017) examined technology mediated instruction and its effect on cognitive scaffolding, motivation and academic performance in EFL Context. A mixed method involving quasi-experimental research, quantitative and critical ethnography approach was used. Telegram as an academic mediation and collaborative learning tool was taken as an independent variable. Cognitive scaffolding, motivational level and academic achievements were taken as dependent variables. 80 learners from two intact classes at Islamic Azad University were selected as the experimental and control groups. Telegram as a tool was used in the experimental group, while the control group received traditional way of instruction. To measure the students' motivational level in both groups, Course Interest Survey was administered at the end of the semester. The total average score for each group was calculated. To compare students' academic achievement, their average scores in the final academic test were considered. An Independent samples t-test was used to compare the mean scores. The results indicated that technology mediated learning brought about cognitive scaffolding and the students in the experimental group

outperformed the control group in terms of motivation and academic achievement. The results of the interview meant to measure the level of collaboration also revealed that Telegram messaging also increased students' confidence, participation in online discussion, thereby helping them to communicate with their peers in order to improve their study.

Xodabande (2017) examined the effectiveness of using social media network Telegram in teaching English language pronunciation to Iranian EFL learners. Participants of this study included 30 respondents who received di ff erent treatments over the four weeks. Independent samples t-tests to compare the results of both groups in pre-test and posttest and one way ANOVA to compare the scores of participants in three different times i.e. pre-test, post-test, and retention test was used. The results of pre-test and post-test revealed that the pronunciation of participants in experimental group improved significantly compared to control group but there was no significant improvement in pronunciation of participants in experimental group from post-test to delayed test (retention) which was administered four weeks later.

Zarei *et al.* (2017) examined the effects of Telegram on Iranian EFL learners' vocabulary knowledge and their attitude towards vocabulary learning. A group of 100 advanced EFL learners participated in the study. The participants were selected after they took the Oxford Quick Placement Test and they were divided into experimental and control groups. The participants had a three-week vocabulary instruction. The treatment was similar for both groups except for exercises done after the class. The participants in the experimental group were asked to fill out an attitudinal questionnaire after the treatment. Then, a vocabulary test was administered among the participants of both groups. Results of the independent-samples *t*-test run on the collected data indicated that participants of the experimental group outperformed those of the control group. The findings of the attitudinal

questionnaire showed that the participants had positive attitude toward using Telegram. The conclusion drawn is that those in the experimental group were free in using the online group to interact with each other.

Movafagh (2017) investigated the effect of using Telegram Messenger on Iranian EFL learners' vocabulary learning. From among 120 candidates, 100 of them were chosen randomly. After homogenizing the participants by Oxford Placement Test (OPT), 50 students were chosen as the main sample size and were randomly divided into two groups: one control and one experimental group, each having 25 students. Thereafter, the multiple choice vocabulary pre-test was administered to all subjects to ensure their homogeneity prior the beginning of the study. Among all questions in pre-test, 40 questions, which were not correctly answered, were chosen for teaching in next step. In the treatment period, students in experimental group were taught via Telegram Messenger while in the control group they were taught traditionally. After 8 sessions of treatment, the post-test was administered to assess the participants' improvement in both groups. The result of the independent samples t-test revealed that students in experimental group had more progress than the students in the control group meaning that Telegram Messenger had significant effect on improving vocabulary knowledge of Iranian intermediate EFL learners. The findings consolidate the role of mobile phones as effective tools in teaching and learning vocabulary.

Adesope and Nwaizugbu (2018) carried out a study to investigate Telegram as a social media tool for teaching and learning in Nigeria. The population of the study comprised 400 level students in the Faculty of Education, University of Port Harcourt from three

Departments namely: Curriculum Studies and Educational Technology, Educational Foundation and Educational Management. The sample comprised 300 students where mean scores, standard deviation, ANOVA and correlation were used as statistical tools. Simple random sampling technique was used for the study and the instrument used to

collect data was a structured questionnaire titled Telegram as a social media tool for teaching and learning in tertiary Institution (TSMTTLTI) which made up of 20 items. The instrument was validated by experts in the field of Educational Technology. Test re-test was applied to test the reliability of the instrument, and a reliability coefficient of 0.64 was obtained. It was found that students use Telegram for teaching and learning purposes. The study also discovered that Telegram is a valuable extension of the classical learning methods because it encourages active collaboration among students

Nuzulul-Wahju and Ferra (2018) investigated the influence of using Telegram on the writing achievement of XI grade students at SMKN 8 Surabaya using quantitative approach with true experimental design which consisted of two groups pre-test and post-test. The researcher gave a pre-test to students before using Telegram as a media and gave post-test after using Telegram for experimental class in XI Fashion Department 3 in SMKN 8 Surabaya. A sample of 231 students was randomly selected for the study. The t-test statistics was used to analyse the data. The result of the study showed that there was a significant influence of Telegram on students' writing achievement.

Nabati (2018) studied the effect of using Telegram application for EFL (English as a Foreign Language) learners' writing accuracy and learning grammar points. Twenty intermediate EFL learners were selected from the vacant language learners in a language institute to participate in this study. The students who achieved the required score on a language proficiency test (the Oxford Placement Test, OPT) were selected as the participants. Pre-test was given before the treatment sessions to control the participants' grammar knowledge and writing accuracy at the beginning of the research. During a term which has sixteen-session course, the teacher presented the instruction on grammar and accuracy in writing to the participants by instant messaging, using telegram. At the end of

semester, they were given the post-test. Data were analysed through paired sample t-tests to compare the means of the pre-test and the post-test of the learners. It was discovered that writing accuracy of the participant had improved by receiving instruction of grammar points through social network (Telegram App). There was a significant difference in the means of the participants on the pre-test and post-test. They performed more effectively on the post-test, which can be attributed to instruction through social networking.

Fathi (2018) examined blended language learning using social media networks (telegram and instagram) as pedagogical tool to enhance reading comprehension. The study adopted a mixed method study involving quasi-experimental research and an adapted a qualitative and critical ethnography approach. A homogenous sample of 42 intermediate level students drawn from two intact classes offering intensive English at Shokouh English Institute, Karaj Branch participated in the study. The participants were assigned to two experimental groups and a control group. The experimental groups (Telegram and Instagram) were exposed to explicit training through an app-based condition. A communicative approach with an emphasis on real communication was followed in the class. The teaching methodology included consciousness-raising tasks using a text from the Internet, followed by teacher-to-student discussions about the applied strategies. A pre-test, post-test and an attitude questionnaire and a Placement Interchange Test, which was administered to the learners at the outset of the study to make sure they were homogeneous in terms of language proficiency before the treatment were used as instruments for data collection. Inferential statistics involving ANOVA, ANCOVA, Pearson Product Moment Correlation and t-test were used to analyse the hypotheses generated for the study. Results showed that students exposed to instruction on Telegram and Instagram performed better than those exposed to normal conventional method. When

the two platforms (Telegram and Instagram) were compared, it was discovered that the students exposed to instruction on Telegram performed better than those on Instagram.

Shima and Saeed (2018) investigated the effect of using Telegram stickers on EFL learners' vocabulary learning. To this end, 60 Iranian intermediate EFL learners (30 males and 30 females) at Islamic Azad University, Shahreza Branch were selected through the convenience sampling method. They were then assigned randomly to the experimental and control groups. A pre-test was administered to measure the learners' vocabulary knowledge in both groups. The experimental group received their lessons via Telegram while the control group experienced the conventional teaching techniques. An approved post-test was then administered to both groups in order to check the participants' possible progress and results indicated that teaching vocabulary through Telegram stickers could lead to outstanding advantages for the learners. In other words, social networking had a positive impact on learning new vocabulary items among Iranian EFL learners.

Saaleni (2018) examined the effectiveness of using social media network Telegram in teaching English language pronunciation to Malaysian learners. Participants of this study included 24 Malay learners who received different treatments over the four weeks. The results of pre-test and post-test revealed that the pronunciation of participants in experimental group improved significantly compared to control group but there was no significant improvement in pronunciation of participants in experimental group from post-test to retention test which was administered four weeks later. The results of current study revealed that using social media networks in teaching language features can be very effective and promising.

Aghajani and Adloo (2018) examined the effect of online cooperative learning on students' writing skills and attitudes through Telegram application. A total of 70 university

ESP learners were involved. Telegram, as the treatment in this study was compared to a conventional method; face-to-face in the cooperative writing activities.

First of all a pre-test was administered to all students and based on the preliminary results; students were divided into Telegram and face-to-face Cooperative writing groups. After using both approaches, a post-test was given to participants. Then, a questionnaire was given to the students in order to investigate the effect of Telegram on the attitudes of ESP vocabularies and expressions. The data were the analysed using independent t-test and paired sample t-test. It was found that participants in Telegram Cooperative writing groups displayed slightly higher scores compared to face-to-face Cooperative writing groups. The students demonstrated their ability to assimilate into the socio-cultural practices of their respective Telegram communities, gain knowledge, skills and engage in written dialogues and conversations with them. Telegram also allows students to discuss with peers, give feedback and comment on the writing activities either synchronous or asynchronously.

Azman *et al.* (2018) carried out a study to enhance students' interests in English language teaching and learning by using Telegram and Quizlet which was coined Qgram that creates interactive, differentiated and feasible learning platform that fits different learners' learning styles. 50 Form 5 students were selected from two secondary schools in Kluang, Johor and Petaling Perdana, Selangor. An action research using

McNiff model was conducted throughout a 4-week of reading and grammar lessons. The students were exposed to having instructions and discussions in Telegram and doing exercises in Quizlet application. Interview and observations on the participations of students in both Telegram and Quizlet were conducted to view students' perceptions on this Qgram innovation. The finding showed that learners enjoyed using Qgram innovation in English teaching and learning as they found Telegram and Qgram were interesting, feasible and interactive. Qgram offers a new dimension of English language learning that

utilises both Telegram and Quizlet applications which create more interesting and fulfilling learning mediums. Findings also revealed that the platform enables very high collaboration among students.

Fahimeh and Zahrah (2019) carried out a study titled Employing Telegram Application: Learners' Attitude, Vocabulary Learning and Vocabulary Delayed Retention using a mixed method involving post-test quasi-experimental study. Data were gathered through a group interview with the participants chosen through purposive sampling. The population included 32 Persian-speaking Iranian Business Management students who were taking English as a General course ranging in age from 18 to 35. The Oxford

Quick Placement Test version 2 was administered to determine the participants' level of English to ensure the homogeneity of experimental and control groups. Moreover, researcher-made vocabularies test (multiple choice formats) as a post-test was designed to examine the participants' learning of vocabulary items. The test items were selected from their course book. The reliability of the test was checked through piloting it with a representative sample and a Cronbach's alpha of 0.68 was obtained. It was confirmed that there was a significant effect of online practicing on vocabulary learning of the language learners. Furthermore, it was found out that the participants held a positive attitude for practicing target words through Telegram. In addition, the results showed that using Telegram application does not have a significant effect on the retention of the vocabulary of the learners.

Tabrizi and Onvani (2020) investigated the Impact of Employing Telegram App on Iranian EFL Beginners' Vocabulary Teaching and Learning. Quasi-experimental research design was used. Thirty one Iranian students, aged 10-14, were selected through the convenience sampling method. The teacher taught English vocabulary to the participants in two ways:

for four weeks by using Telegram and for another four weeks through the traditional face-to-face classroom instruction. A pre-test, post-test, and an attitude questionnaire, as well as a Placement Interchange Test were administered in order to collect data. 40-item multiple-choice questions approved by 3 university professors for validity were used to collect data. The KR-20 reliability of the test was 0.78. Comparison of the scores obtained from words taught through Telegram and the scores of the traditionally-taught lexical items gave rise to the conclusion that learning vocabulary through the social network was more effective than the traditional approach.

Vahdat *et al.* (2020) investigated the impact of Telegram on collocation learning of Iranian EFL learners. A total of 40 high school participants whose language proficiency homogeneity was examined through a language proficiency test were selected and randomly divided into two equal-in-number groups of 20 students in the experimental and control group. The study adopted the pre-test post-test quasi-experimental approach.

To minimize the effect of participants' background knowledge in terms of collocations, a pre-test was administered to the participants. At the end of treatment sessions, parallel to the pre-test a teacher-made collocation knowledge test was administered for both the control and experimental groups in order to measure the learners' progress as a result of instruction. The experimental group installed Telegram application on their mobiles or tablets for collocation learning and retention, whereas the control groups were not allowed to use any tool. To ascertain that the participants were statistically different in terms of collocation learning, an independent samples t-test was run between the experimental and control groups' post-test scores. A paired samples t-test was also conducted to compare the mean scores of pre-test and post-test of both groups. The results showed that there was a significant difference between the performance of experimental and control groups in

favor of experimental group confirming the effect of Telegram on improving collocational knowledge among Iranian high school students.

Suryati and Adnyana (2020) checked the influence of telegram-assisted blended learning strategies on mathematics learning outcomes in terms of students' learning styles in an Indonesian university. The research adopted a 2x3 factorial design involving the pre-test post-test quasi-experimental design approach. The population of the study comprised of second semester students of informatics engineering at the STMIK STIKOM Indonesia campus. A total of four intact classes were selected out of which two of them each were randomly assigned into experimental and control groups. An achievement test and questionnaires which were validated by experts were used as instruments to obtain information. Normality and homogeneity tests were used as a prerequisite before analysing the result. Two way ANOVA was used to analyse the results of the experiments and findings revealed that students taught mathematics using telegram-assisted blended learning approach performed better than those taught using normal conventional method.

2.3.2 Empirical studies on whatsapp and academic achievement

Ibtehal and Fawzi (2013) investigated pre-service Arabic language teachers' perceptions of the impact of integrating WhatsApp mobile instant messaging on the enhancement of their instructional interaction. Data was collected using semi-structured interviews and an analysis of the postings on WhatsApp platform. To analyse the data drawn from interviews and participants' postings on WhatsApp platform, the framework of verbal analysis method was used. It was conducted at Professional Diploma Program in Teaching at Al-Ain University of Science and Technology in the United Arab Emirates. A virtual learning platform supported by WhatsApp social networking was created as an additional component to Methods of Teaching Arabic course over fifteen weeks. In addition to the face-to-face class meetings, students were requested to make both collaborative and

individual weekly contributions to the WhatsApp platform. The results revealed that WhatsApp had the power to enhance the three types of interactions, 71% of the participants reported that it enhances student-student interaction, 54% reported that it enhances student-content interaction and 42% of the participants stated that it enhances student-instructor interaction. They concluded that WhatsApp platform offers them a space for communicating, expressing ideas and exchanging information anytime and anywhere.

Basma (2013) examined whether WhatsApp electronic journaling as a new application in smart phones has a significant effect on writing vocabulary word choice and voice of undergraduate Saudi students. In the quantitative, quasi-experimental study, data were gathered using a pre-test post-test design using a sample of 30 EFL undergraduate female students in Languages and Translation College at Al-Imam Mohammad Ibn Saud Islamic University in Saudi Arabia. A rubric is used to score a writing sample from each student before and after treatment, and significance is measured using Kruskal-Wallis, Friedman, and the Wilcoxon tests. The students were required to post their reflective comments on different topics to their group which was created through WhatsApp. The students reacted well to the discussions through their dialogue journaling. They treated it as if it were play rather than class work; however, at the end of the experiment, the students know more about the writing processes of one another and their use of words is improved. This sense of enjoyment allows for the students to use WhatsApp electronic dialogue journaling as a tool for learning. Results indicated a significant difference between the overall writing scores of the pre-test and post-test of the students that journaled. In addition, examination of individual item scores reveals that there are statistically significant improvements in vocabulary word choice and voice as two critically important writing factors.

Amry (2014) investigated the impact of using WhatsApp mobile learning activities on the achievement and attitudes of online students using mobile devices at the university. Researcher conducted an experiment in the 2014 academic year. Specifically, this study compares an independent sample of students in an experimental group (15 students) with a control group (15 students) from a university class. The e-learning process of the experimental group is based on WhatsApp mobile learning activities. The e-learning process of the control group is without WhatsApp mobile learning activities and receives only face-to-face learning in the classroom. A learning unit of the same course educational media is experimented with the experimental and control group. An achievement was used as a data gathering tool. The t-test was used to compare the differences between the experimental and control groups. The results of the experimentation show that there are real differences, at 0.05 alpha level, in the achievements and attitudes of the experimental group compared with the control group.

Sahan *et al.* (2016) investigated the effect of WhatsApp on teaching English idioms to EFL students in Turkey. A number of 33 B1 level EFL students voluntarily participated in the study. The sample group included 16 female and 17 male students, who ranged in age from 17 to 21. The educational system of the school consists of 4 quarters based on 4 distinct language levels. Each class in all levels includes at most 14 students and in each level students are educated for 30 hours weekly. At the B1 level, students receive a weekly instruction of 7 hours on reading, 4 hours on writing, 8 hours on grammar, and 11 hours on oral communication (listening and speaking). A pre-experimental design was used in the study, given that the research lacked a control group and a pre-test. The students received three idioms per week for five weeks via WhatsApp. The data for this study were collected with two data collection instruments, achievement test and an interview that measures collaboration amongst students. The interview questions concentrated on areas

such as ubiquitous learning, collaborative learning, social interaction, and learning idioms through WhatsApp. The quantitative data of the study from the achievement test results were analysed by using descriptive statistics to understand the educational usefulness of WhatsApp. Thematic content analysis was used to analyse the interview data. The results revealed how students benefited from WhatsApp as a learning tool with a mean score of 87. The students overwhelmingly reported that WhatsApp groups provided them with a sincere atmosphere to communicate effectively in English outside the school borders. Apart from interacting with their peers and the content, some students mentioned that they felt motivated since they had the opportunity to interact with the instructor outside school.

Ashiyan and Salehi (2017) compared male and female students' English collocation learning who utilized WhatsApp as a mobile application in learning. The study adopted a pre-test post-test quasi experimental approach. A sample of 60 male and female EFL learners was selected where Oxford Placement Test (OPT) was conducted to both male and female in a language institute. In order to check the reliability of the collocation pretest, the test was pilot studied on 15 learners and a reliability figure of 0.81 was obtained using Kuder Richardson. The two genders of participants in experimental group were suggested to use WhatsApp in order to practice and repeat the collocations. However, the male and female participants in control group received collocations instruction through the conventional method. After treatment, both groups were examined by a post-test. Mean and standard deviation as well as ANOVA were used to analyse the results and the findings showed that WhatsApp effectively improved the collocation learning of students and that gender does not have any influence on students' collocations achievement.

Liya and Dede (2017) investigated the effect of WhatsApp in blended learning on EFL undergraduate students' reading comprehension ability using an experimental research with participants of students at second semester at one private college in PekanbaruRiau,

Indonesia. The 20 students were randomly and equally assigned to the experimental group and another 20 students as the control group. The instrument of this research was reading comprehension test in form of multiple choices, used as pre-test and post-test to assess the participants' reading comprehension ability in both experimental and control group. The students were enrolled in English II course, Reading class. They met in class once a week. Each time covered 100 minutes. The length of the semester was 14 weeks, but the researcher only gave treatment during 8 meetings. The reliability of the test was 0.81 which was indicated as an acceptable level of reliability. The reading comprehension test score were used to analyse students' improvement by using SPSS; descriptive statistics were used to investigate the means and standard deviation of each variable. An independent t-test was analysed to determine differences between the means of the experimental and control group. The result of showed that there was a significant effect in blended learning through

WhatsApp on EFL undergraduate students' reading comprehension. The students who used WhatsApp in blended learning environment showed higher scores than those who did not. The experimental group read more texts and with their peers via WhatsApp, therefore it enhanced their reading comprehension.

Arash *et al.* (2018) investigated the effects of using WhatsApp on Iranian EFL learners' vocabulary learning. 50 Iranian female participants were selected among 80 students from Adiban English language institute, Baghmalek, Khuzestan, Iran. They were at the intermediate level of English proficiency based on the results of Oxford Quick

Placement Test. The selected participants were then randomly divided into two equal groups: one experimental group and one control group. Afterwards, the researcher gauged their proficiency level of English vocabulary knowledge by a vocabulary pretest. Then, the English words were instructed to the experimental group through

WhatsApp; they used WhatsApp in order to practice the selected words outside of the L2 classroom. In fact, the researcher formed a group in WhatsApp and through the channel he sent the words to the participants in the experimental group. The control group received the word instruction through the traditional method. In the control group, the participants took part in in-door classes and the words were taught to them by the researcher in a face to face fashion. The whole instruction lasted 8 sessions. In the first two sessions the OQPT and the pre-test were administered respectively; in 5 sessions the treatment was applied, and in the last session the post-test was given to the participants of both experimental and control groups to determine the impacts of

WhatsApp on the students' vocabulary learning. The results of paired samples and an independent samples t-test indicated that there was a significant difference between the post-tests of the experimental and the control groups. The findings reveal that the experimental group significantly outperformed the control group on the post-test.

Ruba *et al.* (2018) examined the potential effect of an eight-week e-mail- and WhatsApp-based instructional treatment on 45 Jordanian EFL tenth-grade students' paraphrasing and summarizing skills using an experimental design. A sample of four intact tenth-grade sections, comprising 127 students, was purposefully drawn from the Bahraini Basic School for Girls in Irbid, Jordan. After the initial purposeful selection of the school, three instruments were used for data collection: a pre-test, a post-test and an interview schedule. The reliability of the instrument was established by piloting it on a group of 30 students who were excluded from the main sample of the study, allowing a two-week interval between the two administrations of the test. Pearson Reliability Coefficients between the two administrations amounted to 0.86 for the items pertaining to paraphrasing, 0.87 for the items pertaining to summarizing, and 0.88 for the overall test. Descriptive statistics together with Analysis and Multivariate Analysis of Covariance and Boneferroni's

Equation of Multiple Comparisons were used to determine any potentially significant differences among the participants as a result of the instructional treatments. The findings reveal statistically significant differences (at $\alpha = 0.05$) in the participants' mean scores on the post-test in favour of those in the WhatsApp group, combined e-mail and WhatsApp group, and e-mail group,

respectively.

Cetinkaya and Sutcu (2018) examined the effect of Facebook and WhatsApp on success in English vocabulary using a mixed method approach of qualitative and quantitative method. A pre-test post-test quasi experimental group design was used for the quantitative approach. The students were grouped into two experimental groups and a control group where they were exposed to instruction on Facebook, WhatsApp and normal conventional approach respectively. The findings revealed a significant difference in the mean scores of the three groups with WhatsApp having a higher mean, followed by Facebook, then the control group.

Ilobeneke *et al.* (2018b) investigated the effect of Facebook and WhatsApp supported instructional platforms on undergraduate students' retention in educational technology. A three by three by two (3x3x2) factorial design was adopted using pre-test- post-test, randomized, control group approach. Three research questions and three research hypotheses were raised to guide the study. A total of 180 educational technology students selected from three universities out of five universities offering educational technology in Nigeria were randomly assigned to Experimental Group I (exposed to

Facebook supported instructional platform), Experimental Group II (exposed to WhatsApp supported instructional platform) and Control Group (taught through lecture method). Educational Technology Achievement Test (ETAT) was used for data collection. ETAT was validated by experts and a reliability coefficient of 0.734 was obtained using Pearson Product Moment Correlation Coefficient formula. Data gathered were analysed using Analysis of Variance and T-test analysis and significance

was ascertained at 0.05 alpha levels. Findings revealed that significant difference exists in the mean retention scores of the three groups (Fcal =110.885; df = 179; P<0.05). However, no significant different exist in the mean retention scores of male and female students taught educational technology using WhatsApp supported instructional platform (P>0.05 level of significant (P=0.25). This shows that WhatsApp supported instructional platform is gender friendly.

Hassan and Ahmad (2018) examined the impact of WhatsApp on Learners' Achievement: A Case Study of English Language Majors at King Khalid University. All the participants of the study were male students due to gender segregation in the universities in Kingdom of Saudi Arabia. 60 male undergraduate students at the Department of English, College of Science and Arts, King Khalid University took part in this study. They are all native speakers of Arabic and their ages range from 21 to 26.

They were homogeneous in terms of their linguistic and socioeconomic backgrounds. They all have started learning English between the age of 12 and 13. They were divided equally into two groups: experimental and control group. Data were collected through an achievement test and a questionnaire. The tests included first midterm test, second midterm test and final test. The first midterm test was conducted in the seventh week, the second in the fourteenth week and the final in the seventeenth week of the semester. All the tests were studied and evaluated carefully. Moreover, the participants of the experimental were given a questionnaire of 15 items on Five-Point Likert scale. The WhatsApp group allowed the experimental members to share problems and ideas among themselves at all times. They used different options of the network like chatting, calling, video chatting, document sharing, etc. to interact and collaborate with each other. Students of the group were encouraged to chat, talk and video chat individually and in groups to solve the problems they faced in the course. The data were analysed using ANOVA, t-test and descriptive statistics. Results showed that the experimental group performed better than the control group. Findings also showed that student demonstrated some collaborative

learning features among themselves through their interactions, exchange of ideas and problem solving.

Gurluyer (2019) investigated whether there is any significant change in first year students' perceptions and any significant improvement in their learning EFL vocabulary via WhatsApp. Quasi-experimental design was used. 79 students (16 males and 63 females) participated in the study from a state university. The instruments used to collect the data of this study were both the students' questionnaire and the vocabulary knowledge test. The test consisted of 90 multiple-choice items and 10 fill-in-the blanks items. The total hundred items were taken from the 202 word items that the students were to learn during 8 weeks. The test content and face validity of the questions as well as the difficulty level were controlled by expert EFL professors. The test reliability was calculated using Cronbach and a figure of 0.86 was obtained. For eight weeks, they used WhatsApp application both inside and out-side the classroom and had the opportunity to tap the screen to listen to the pronunciations of the words time and again. Findings showed statistically significant differences between the mean scores in favor of the students that used WhatsApp. Furthermore, the results showed that this improvement in learning EFL vocabulary performance may be largely attributable to WhatsApp application. On the other hand, this method promoted the motivation and engagement of the students during in-class hours and outside of the classroom. It was also concluded that this method facilitated the responsibilities of the students in their learning EFL vocabulary, and they were highly involved during in-class hours.

Ofoka (2019) investigated the effect of blog and microblogging sites on college of education pre-service teachers' agricultural science learning outcomes in Lagos State. The study adopted a 4x3x2 factorial design using a pre-test, post-test and control group design.

The population of the study comprised of all the 229 registered pre-service agricultural science teachers in Lagos State. A sample of 117 pre-service teachers was drawn using a simple random sampling. They were assigned into three experimental groups and one control group. Experimental group I was taught using blog; experimental group II was taught using Facebook platform and experimental group III was taught using WhatsApp learning platform. The control group was taught using lecture method. Intact classes were used for the study. Agricultural science achievement test, questionnaires to measure attitude of students on blog learning platform, Facebook learning platform and WhatsApp learning platform were used. The treatment tools were the three learning platforms assigned into experimental groups I, II, III and control method. The instruments were validated by experts in the field of educational technology. The instruments were tested using split-half method where a reliability coefficient of 0.87, 0.84 and 0.83 was obtained for the attitude questionnaires using Cronbach Alpha for blog, Facebook and WhatsApp learning platforms respectively. The agricultural science achievement test had a reliability of 0.81. The data obtained were computed using mean and standard deviation for the research questions while ANOVA was used to compute the null hypotheses at 0.05 level of significance. Findings revealed that there was a significant difference in the scores of students taught using blog,

Facebook, WhatsApp and lecture methods. There was a significant difference in the retention of blog, Facebook and WhatsApp; there was no significant difference in the achievement of male and female students taught using blog; there was no significant difference in the achievement scores of male and female taught using WhatsApp; there was no significant difference in the achievement scores of male and female students taught using Facebook; there was no significant difference in the retention scores of male and female taught using WhatsApp: there was no significant difference in the retention scores of male and female students taught using blog; there was no significant difference in the retention scores of students taught using Facebook.

Almogheerah (2020) investigated the effect of using WhatsApp-based learning activities on developing idiom knowledge among Saudi university English as a foreign language (EFL) students compared to conventional method. A total of 70 female students in the

Department of English Language and literature at Imam Mohammad ibn Saud Islamic University were involved in the study. They were assigned into two groups: experimental group taught English idioms via WhatsApp-based instruction and control group who were taught English idioms conventionally. Two instruments were used to collect the data: a pre-post idioms achievement test and a post-study questionnaire. The findings demonstrated that the experimental group significantly outperformed the control group in idioms achievement post-test. Moreover, the results showed that the majority of the experimental group demonstrated some level of collaboration towards learning English idioms via WhatsApp which helped their overall scores.

2.3.3 Related empirical studies on telegram, gender and achievement

Naderi and Akrami (2018) studied the effect of instruction through Telegram groups on learners' reading comprehension using a quasi-experimental design. 147 subjects were selected and a standard placement test was used to harmonize them, which reduced the participants to 103 among which 55 were chosen randomly as experimental group (29 females and 26 males). The rest were assigned to control group (26 females and 22 males). After the experiment, a post test was administered and results showed that those taught with Telegram group perform better than those taught under normal circumstances. It was also discovered that there was no significant difference between male and female performances with respect to Telegram.

Dambo and Kayii (2018) researched the effectiveness of blended learning strategy on the achievement scores of undergraduate students of Business Education in Rivers State University. The study adopted a pre-test post-test quasi-experimental control design. A total of 365 year one students in the Department of Business Education of the Rivers State University formed the population and sample of the study. The instrument that was used

for the study is a self-developed one titled Blended learning students' Achievement Test (BLeSAT). The reliability coefficient of 0.73 was determined using Kuder Richardson (K-R21) formula. Data obtained were analysed using mean for research questions, and Z-test and ANOVA used to test the hypotheses at 0.05 level of significance. Results showed that the that there is no significant difference in the mean achievement scores of male and female students taught Elements of Business Management with Blended Learning strategy. Although, there was no statistical difference in the post-test mean scores of students of Accounting, Management, Marketing and Office and Information Management options and there was a significant statistical difference in the post-test mean scores of students of the three groups based on level of online interaction.

Jimoh *et al.* (2018) investigated the effect of three modes of mobile instructional package on achievement and gender of mathematics students in colleges of education, in North-Central Nigeria. The study adopted a pre-test post-test randomized experimental design. The target population for the study was all the NCE one mathematics students in North-Central Nigeria. Multi-stage sampling was used to sample the schools and students for the study. A random sample of 120 students (75 male and 45 female) were selected from three randomly selected colleges of education, in North-Central Nigeria. The research was guided by three research questions and three null hypotheses and tested at 0.05 level of significant. The researchers developed mathematics mobile instructional package on mathematical concepts on trigonometry, which was used as treatment for experimental groups. A pilot study was carried out to test the research instrument. A reliability coefficient of 0.85 was obtained using the split-half method. Thirty (30) multiple choice questions were administered to both groups before and after the treatment. Mean and standard deviation were used to answer the research questions while analysis of covariance (ANCOVA) was used to test the research hypotheses. The findings of the study revealed

that there was no significant difference in the achievements and gender of mathematics student taught using Video Only, Audio+Text and Text Only.

Kareem *et al.* (2018) studied the effects of Facebook in teaching sculpture in colleges of education in Oyo State. The quasi-experimental research design was adopted for the study. Random sampling technique involving forty-eight (48) students was used in the study. 26 students from Federal College of Education (Special) in Oyo where assigned to experimental group while 22 students from Emmanuel Alayande College of Education in Oyo constituted the control group. Facebook video package was used as an instrument for actual treatment for experiment group. The instruments for data collection were Sculpture Achievement Test, Sculpture Skill Test and Sculpture on the Spot Skill Assessment instrument, which were validated by experts. Both groups were pre and post-tested before and after the treatment. Data were analysed using mean and standard deviation for research questions while t-test and ANCOVA were used to test the null hypotheses at 0.05 level of significance. The result showed a significant difference between experimental group and control group mean scores of Fine Arts students' performance in sculpture but there was no significant difference between the male and female main scores of FAS performance in sculpture. However, there was a significant interaction impact of treatment and gender on the mean scores of FAS performance in sculpture.

2.3.4 Empirical studies on whatsapp, gender and achievement

Bawa and Ibrahim (2016) examined the impact of WhatsApp in extending learning into undergraduate students' digital lives and how it influenced their academic performance in general studies (peace and conflict resolution). Quasi-experimental design with a non-equivalent, non-randomized groups involving 2x2 factorial was adopted for the study. Intact classes of 78 and 82 undergraduate students from Federal University Birnin Kebbi

and Kebbi State University of Science and Technology were purposively selected as sample for the study. The two institutions were assigned to experimental group 1 and experimental group 2 through balloting. In this study, two instruments were used: comprehensive GST dummy (CGSTD) and GST achievement test (GSTAT). Pilot study was conducted and reliability index of 0.87 was obtained for the GSTAT using Kuder Richardson (KR-21). Three hypotheses were formulated and tested using analysis of covariance (ANCOVA) and z-test. Results showed that there was a significant difference in the academic performance of undergraduate students exposed to a comprehensive GST dummy and those treated in a blended setting (using WhatsApp), where those treated in a blended setting using WhatsApp performed better. The findings also indicated that students exposed to WhatsApp collaborative page performed significantly better than those exposed to only the dummy. This revealed that collaborative learning through social media plays significant role in improving students' performance. No significant difference was found in the academic performance of the undergraduate students based on gender.

Jafari and Chalak (2016) investigated the role of WhatsApp in the vocabulary learning improvement of Iranian junior high school EFL students. Using a mixed method design, a group of 60 students including 30 male and 30 female students studying at two male and female junior high schools in Isfahan, Iran participated in the study. A pre-test and post-test were used. Four English classes were instructed and the experimental group received vocabulary instructions electronically four days a week for four weeks using the WhatsApp while the control group was taught vocabulary of their textbook inside the classroom by traditional method used in all Iranian schools for teaching English to students. The results revealed that using WhatsApp had significant role in vocabulary learning of the students. The results also showed that there was not a substantial difference

between male and female students regarding their vocabulary knowledge after using WhatsApp.

Bataineh *et al.* (2018) examined gender and EFL writing, whether WhatsApp can make any difference among Jordanian eleventh grade students. A pre-test post-test quasi experimental design was used for the study. A total of 98 students from two intact classes were purposively selected from Yarmouk University Model School to be used for the study. The students were assigned into two experimental groups of male and female students. The two experimental groups received treatment via WhatsApp instruction designed to improve their writing performance. A writing test with a reliability figure of 0.88 was used as an instrument for data collection. The results were analyzed using t-test statistics and the finding revealed that female students performed better than their male counterpart in terms of improvement in their writing skills.

Ilobeneke *et al.* (2018a) investigated the effect of Facebook and WhatsApp-supported instruction on undergraduates' achievement in educational technology using a 3x2 factorial design involving pre-test post-test technique. A total of 180 educational technology students selected from three universities offering educational technology in Nigeria were used as a sample for the study. The groups were randomly assigned into two experimental groups and a control group. Educational technology achievement test validated by experts was used for data collection. The instrument had a reliability of

0.73 using Pearson product moment correlation. Data were analysed using t-test and ANOVA statistics. The findings showed that there was a significant difference in the mean achievement of the three groups; and that there was no significant difference in the performance of the groups exposed to Facebook and WhatsApp instruction based on gender.

Omar (2021) investigated the impact of using WhatsApp groups on the Palestinian university students' productive skills improvement. A pre-test post-test quasi experimental design was adopted for the study. A sample of 60 students studying English 101 as a compulsory course was used for the study. The two groups were divided into experimental and control group. The experimental group were exposed to a blended instruction on WhatsApp while the control group were exposed to instruction using the conventional approach. The researcher developed two instruments named Writing Skill Test (WST) and Speaking Skill Test (SST) with a reliability of 0.62 and 0.56 respectively. Descriptive statistics involving mean and standard deviation as well as t-test and ANCOVA were used to analyse the results. It was discovered that students' speaking skills improved by 31.5%, while their writing skills increased by 43.2% after receiving instruction on WhatsApp. However, while the study revealed no significant difference in the performance of male and female students in the speaking test, a significant difference was found in the performance of male and female students in the writing test.

Safitri (2021) investigated the impact of WhatsApp in teaching vocabulary on the learning achievement of the staff of Umbul Ponggok Klaten. The participants of the study included 30 people consisting of 15 male and 15 female staff. A true experimental design was adopted for the study out of which the participants were assigned into experimental and control groups by the researcher. A vocabulary achievement test which was administered as a pre-test and post-test to both respondents was used to collect data for the study. The participants in the experimental group were exposed to instruction via WhatsApp while those in the control group received no treatment but just normal teaching. The findings revealed that the use of WhatsApp to teach vocabulary improved the performance of the respondents in the experimental group better than those in the control group. While there was a general improvement in the pre-test and post-test scores of the male and female staff

after exposure to WhatsApp instruction, however, the male staff performed better than the female staff after the admission of the post-test.

2.3.5 Related empirical studies on telegram, gender and retention

Gambari and Adamu (2008) studied the impact of videotaped instruction on the teaching, learning and retention of primary school teachers in Minna, Niger State,

Nigeria. 20 primary two pupils were selected from two primary schools at random in Minna metropolis. They were randomly assigned into experimental and control group. A video-packaged instructional tool was used as a treatment for the experimental group while the control group were taught using conventional method. A 30-item primary science achievement test (PSAT) was used to collect data. Data were analysed using mean and standard distribution while t-test was used to test the null hypotheses at 0.05 level of significance. Findings revealed that those taught with video package performed better and had high retention than those taught using conventional method. The findings also revealed that there was no significant gender difference in the performance and retention of the two groups.

Owodunmi and Ogundola (2013) carried out a study to examine the gender difference in the achievement and retention of students exposed to electronic concepts through reflective inquiry. The pre-test, post-test, non-equivalent control group quasiexperimental research was used. The study was carried out in Lagos state, Nigeria, where 43 students were assigned into experimental group while 62 made the control group. The instrument for data collection was the Electronic Work Trade Achievement Test (EWTAT). It was validated by experts and subjected to a pilot study where a reliability co-efficient of 0.83 was obtained using Kuder-Richardson formula. Mean and standard deviation was used to

answer the research questions while ANOVA was used to test the null hypotheses at 0.05 significance level. The results revealed that there was a significant difference in the retention scores of male and female students in favour of the female.

Achor *et al.* (2013) examined the effect of computer-based instruction (CBI) on students' retention in Biology in secondary schools in Olamoboro Local Government Area of Kogi State. The population of the study comprised of all the secondary school students in the local government. The students were assigned into experimental and control groups. The experimental groups were taught using a computer based package while the control group were taught using normal conventional method. An achievement test was used to collect the data. ANCOVA was used to compute the results. Findings revealed that a significant difference exists in the retention scores of those taught using CBI and those taught without it. It also revealed that there was no significant difference in the retention scores of male and female students.

Gambari *et al.* (2014) investigated the effectiveness of computer animation and geometry instructional model on mathematics achievement and retention of students in junior secondary school in Minna, Nigeria. It also examined the influence of gender on students' achievement and retention. It adopted a pre-test post-test experimental and control group design. 40 students were drawn from two secondary schools within Minna using stratified random sampling which made up 20 male and 20 female students. Geometry achievement test was used to collect data. The reliability coefficient of the instrument was 0.87 using K-20. GAT was administered as pre-test and post-test. The result was analysed using t-test. Finding revealed that students taught geometry using computer animation performed better in post-test and retention than those in the control group. However, there was no

significant difference in the retention of male and female students taught geometry using computer animation and instructional model.

2.3.6 Related empirical studies on whatsapp, gender and retention

Ajai and Imoko (2015) assessed gender differences in mathematics achievement and retention by using problem-solving learning. The design of the study was a pre-test, post-test quasi-experimental group. The population of the study involved all the senior secondary school students. A total of 428 senior secondary school students one (SS 1) were used using multi-staged sampling from 10 grant-aided and government schools involved in the research. A total of 261 male students and 167 female students were taught using problem-solving learning. An achievement test was used to collect data for the study. The result revealed that male and female students taught Algebra using problem solving method did not differ in their achievement and retention.

Eze *et al.* (2016) studied the effect of gender on students' academic achievement and retention in financial accounting in technical colleges in Anambra State, Nigeria. A quasi-experimental design of pre-test, post-test, non-randomized control group was used for the study. A sample of 138 National Business Certificate year II students from eleven State-owned technical colleges was used in the study. The instrument used for data collection was an Accounting Achievement Test which was validated by three experts and had a reliability coefficient of 0.83 using Kuder-Richardson 21 formula. Descriptive statistics involving mean and standard deviation was used to answer the research questions while inferential statistics involving ANCOVA was used to test the null hypotheses while the hypotheses at 0.05 significance level. The findings showed that male and female students taught financial accounting using Problem-based teaching method performed better with higher post test scores than those taught with lecture method. It was also discovered that

there was no significant difference in the mean retention scores of male and female students taught financial accounting using Problembased teaching method.

Veysel and Ayse (2017) investigated the effect of blended learning on academic achievement. The study adopted a mixed method where questionnaire and an

achievement test were used to collect data. Quantitative data were collected through the evaluation of students' project that they used in the study. A total of 53 students enrolled in the experimental and control group. The study lasted for 7 weeks. A unit of problem solving, computer software instruction and development of software of educational technology were taught to the students through blended learning. The experimental group were taught through blended learning of videoconferencing, blogs and learning management systems while the control group were taught using normal conventional method. Independent t-test and ANOVA were used to analyse the data obtained. Result showed that those taught with blended learning performed better, and that there was also significance difference in the achievement and retention test scores of the two groups in terms of gender.

Bupo (2019) investigated the effect of teaching financial accounting with blended learning approach on business education students' academic achievement and retention in universities in Rivers State. A quasi-experimental, non-randomized pre-test post-test control group research design was used for the study. The population of the study consisted of 685 first-level business education students in two universities that offer business education in Rivers State. A sample of 160 year-one business education students in the two universities (Rivers State University and Ignatius University of Education) were selected foe the study. The researcher used a purposive sampling technique to select two intact classes to be used for the study whereby they were selected as experimental and

control groups. Students in the experimental group were enrolled on a learning management system (MOODLE) which served as the virtual learning environment for the blended learning approach. Financial Accounting Achievement Test (FAAT) which contained 40 items was used to collect data. The instrument was validated by three experts and standardized through item analysis. The reliability of the instrument was determined using Kuder Richardson (KR 21) formula which yielded a coefficient of 0.77. The instrument was administered as pre-test to both experimental and control groups. Descriptive statistics involving mean and standard deviation was used to answer the research questions while inferential statistics involving ANCOVA was used to the test the hypotheses at 0.05 level of significance. The findings revealed that blended learning approach had a significant effect on students' achievement and retention in financial accounting than the conventional classroom approach. The results also revealed that male students did not significantly differ from female students in their achievement and retention in financial accounting when taught with blended learning approach.

2.3.7 Empirical studies on collaborative learning

Chou and Chen (2008) studied Engagement in Online Collaborative Learning: A Case Study of Using a Web 2.0 tool to promote student online collaborative learning. A total of fifty-five college students participated in the two-week study. Qualitative research methodology was utilized to collect data. A self-perception questionnaire was used to elicit participant's opinions about the wiki project. The questionnaire consisted of two parts: four Likert-scale questions and one open-ended question. The results show that the technological tool motivated students to engage in collaborative learning, and its use supports students' learning.

Troussas *et al.* (2013) investigated the topic, Collaborative Learning: Group Interaction in an Intelligent Mobile-Assisted Multiple Language Learning System in Greece. A prototype mobile application was developed for multiple languages learning that incorporated intelligence in its modelling and diagnostic components. One of the primary aims of their research is the construction of student models which promote the misconception diagnosis. Furthermore, they are the key for collaboration, given that students can cooperate with their peers, discuss complex problems from various perspectives and use knowledge to answer questions and to solve problems. A mobile tutoring framework, built up in the context of student collaboration, is presented. Collaborative student groups were created with respect to the corresponding user models. Finally, the prototype was evaluated and the results confirmed the usefulness of collaborative learning amongst themselves.

Al-Rahimi and Othman (2013) carried out a pilot study to investigate the impact of social media use on academic performance among university students in Malaysia. A quantitative approach using a questionnaire was used to draw the data for the study. The data for this study was collected by way of a survey questionnaire administered on 80 undergraduate and postgraduate students during the 2012/2013 academic session. The age-range of the respondents was between 18 to 36. The sample consisted of 31 males and 49 females. Students were instructed in the survey to offer information about their experiences and impact of using social media on academic performance through collaborative learning. SPSS application (Version-20) was used to analyse the data. The instrument used for this study was designed based on the objectives of the study. It was piloted and the Cronbach's alpha of the reliability of the instrument was 0.85. The findings revealed a strong correlation between the student academic performances with engagement with correlation coefficient of 0.679. Findings also revealed that collaborative learning correlation results with interactivity with peers ($r = .496$, $P < 0.10$), interactivity

with the teachers (r= .543, P<0.10) and engagement (r=0.528, P< 0.10) demonstrate positive and significant relationship. The results showed that collaborative learning positively and significantly increased students' performance through interaction with peers, interaction with teachers and active engagement in group discuss.

Williams and Augustine (2015) studied the level of incorporation of collaborative strategies by Post Graduate (PG) students who offer course CGS (801): ICT and Research Methodology in the Faculty of Education, University of Port Harcourt,

Nigeria. A sample size of one hundred (100) students drawn from two departments; Curriculum Studies and Educational Technology and Educational Management were used in the study. The instrument used for the study was a 4-point likert-scale with nine (9) items, validated by experts versed on collaborative learning. The reliability index of 0.67 and an acceptable mean of 2.50 were used in confirming compliance or no compliance to collaborative learning. Only one research question was used in the study. The grand mean and standard deviation of both departments were used in testing the one hypothesis that guided the study. The major finding has it that students see themselves as rivals and thus showed obvious deficiency in knowledge on the power of collaboration in attainment of learning outcome.

Bozanta and Mardikyan (2017) investigated the effects of social media on collaborative learning. A theoretical model was used based on comprehensive literature review. Using an online questionnaire, data were collected from the students of one of the largest university in Turkey. Structural equation modelling was employed as the major statistical analytic technique. The theoretical model was supported by the findings significantly. An online survey was developed and applied to a convenience sample of students of one of the largest university in Turkey. To be able to reach students from different levels and

departments, the survey was emailed to the students registered in that specific semester by institutional communication office. Out of 231 respondents, 166 complete surveys were used in structural equation modelling (SEM) by handling missing values with the complete case analysis. The first section of the survey includes 3 demographic questions which ask for gender, age and educational level of the respondents. 7-point Likert scale questions were used in the remaining parts of the survey. Perceived ease of use and perceived usefulness which are the basic variables of TAM were asked in second and third parts of the survey respectively. The fourth part of the survey which has a question with 3 items is about actual use of social media. The fifth, sixth and seventh sections of the survey includes questions about student interaction, faculty member interaction of students and course engagement level of students, having 4, 4 and 3 items respectively. Question about collaborative learning was asked as the eighth part of the survey having 4 items. The findings indicate that perceived ease of use is a predictor of perceived usefulness and both of these have impact on social media use of students for educational purposes. Social media usage improves peer interaction and course engagement of students and also students' interaction with faculty members.

Udenze and Oshionebo (2020) investigated the extent to which WhatsApp platform could facilitate collaborative learning among undergraduate students in the University of Abuja, Gwagwalada, Nigeria. A mixed method research methodology involving survey and Focus Group Discussion (FGD) was employed for the study. Surveying 400 undergraduates, data from the survey were analysed using Simple Percentage Table (SPT) and Microsoft Office tools, while data that emanated from the focus group were analysed thematically. The study incorporated 'Technology Acceptance Model' (TAM) to direct and guide it. Discoveries from the study found that "perceived usefulness" and "perceived ease of use" spurred the use of WhatsApp among students. Also, it was discovered that

students incorporated and domesticated class WhatsApp group for various purposes, particularly for learning. Overall, the study found that class WhatsApp group facilitates collaborative learning to a large extent from the responses obtained by more than 40% of the responses.

2.4 Summary of Literature Reviewed

This chapter discussed Telegram and WhatsApp as well as their place in teaching and learning. There is no doubt that technology has permeated almost all facets of life, thereby making the world a global village in terms of how we learn and interact with each other. The concept of micro-teaching, which is very important in this study, has been extensively discussed. Furthermore, several empirical studies in the field of social media learning where WhatsApp and Telegram were used to enhance teaching and learning in a collaborative setting have been reviewed. The various studies revealed the importance of social media platforms in classroom settings because they encourage active engagement and interaction amongst students. This can be seen in the various studies pertaining WhatsApp and Telegram where students actively demonstrated their collaborative skills and show their preference towards social media learning because it fosters collaboration amongst student, their teachers and even within groups.

Additionally, social learning theories of Bandura and Vygotsky have been reviewed as applicable in this study, and these theories keenly revealed that students tend to learn through interaction with peers, their teachers as well as through imitation and behaviour modelling. The essence of any online social media collaborative platform is to encourage students to observe and work together in small groups and in individual capacities in order to learn and improve in their areas of weakness. Students can also learn through observing

others as they imitate them all in an attempt to construct their own knowledge by making learning meaningful.

However, the review of almost all the studies revealed that most of the studies were carried out in Asian countries. Going further, apart from being carried out in Asian countries, they were mostly carried out in the field of English (English as Foreign language). From the works revealed, none, to the best knowledge of the researcher, was studied on micro-teaching which is very important in this present study. Therefore, it can be said that two research gaps exists in the study: the first one being a difference by geography in the sense that most of the studies weren't carried out in Africa, not to talk of Nigeria; additionally, there is a gap by discipline in light of the fact that the greater percentage of the studies were carried out in the field of English language with reading, writing and comprehension skills given more attention.

With the technological advancement that changed the way we teach and learn, there is need to enhance the teaching of micro-teaching by augmenting normal classroom setting with an online instruction in order to provide students with the skills and expertise required of them. Based on the foregoing discuss, therefore, this study checked the effect of Telegram and WhatsApp-enhanced instructions in collaborative learning settings on learning outcomes in micro-teaching among undergraduates in Gombe State.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design

The study adopted a pre-test post-test quasi-experimental group design. This design entails the adoption of non-equivalent, non-randomized sample where the researcher cannot randomly sample and assign subjects into groups. Hence, two separate intact classes, from two different schools, were used for the study.

Table 3.1 Research Design Layout

Groups	Pre-test	Treatment	Post-test	Retention	Collaboration
Experimental Group I	O_1	X_1	O_2	O_3	O_4
Experimental Group II	O_5	X_2	O_6	O_7	O_8

Where:

O_1, O_5 = observation of pre-test for experimental group I and II

O_2, O_6 = observation of post-test for experimental group I and II

O_3, O_7 = observation of retention for experimental group I and II

O_4, O_8 = Observation of collaboration for experimental group I and II

X_1= Telegram Learning Platform (TLP)

X_2= WhatsApp Learning Platform (WLP)

3.2 Population of the Study

The population of the study comprised all the 1,012 year three Faculty of Education students in Gombe State, Nigeria. The target population comprised of 282 year three students of Faculty of Education of 2020/2021 academic session that were enrolled on

Telegram and WhatsApp platforms in both Gombe State University and Federal University Kashere.

Table 3.2: Population Distribution

S/N	Name of School	Population
1	Federal University Kashere	474
2	Gombe State University	538
Total		**1012**

Source: Heads of Department of the two Schools (2020/2021 session)

3.3 Sample and Sampling Technique

A sample of 282 year three Faculty of Education students that were enrolled on Telegram (117: male= 61; female= 56) and WhatsApp (165: male= 86; female= 79) platforms from Federal University Kashere and Gombe State University respectively was purposively selected to be used for the study. The choice of year three students was due to the fact that they are the ones offering micro-teaching as a course in preparation for teaching practice exercise. The schools were purposively sampled based on the fact that they are the only two universities in Gombe State offering micro-teaching as a course. Faculty of Education was selected because micro-teaching is taught as a course in the faculty. The two sampled groups were assigned into Experimental Group I and

Experimental Group II using a simple random sampling technique.

Table 3.3: Sample Distribution

S/N	Name of School	Male	Female	Total
1	Federal University Kashere	61	56	117
2	Gombe State University	86	79	165

3.4 Research Instrument

The research instruments for the study consisted of a Micro-teaching Achievement Test (MTAT), as well as one questionnaires named Collaborative Learning Questionnaire

(CLQ) that measured the level of collaboration amongst the students of the two groups. The instruments were developed by the researcher.

3.4.1 Development of micro-teaching achievement test (MTAT)

The micro-teaching achievement test instrument used for this study comprised of 30item multiple choice questions which was developed by the researcher (see appendix B).

The instrument was developed based on Benjamin Bloom's taxonomy table of specifications which cuts across the cognitive domain of educational objectives (see appendix A). The reason for the table of specification was to show the spread of the questions across all the objectives. The achievement test had two sections: A and B. Section A solicited information about the students' personal data, while section B comprised of 30 objective questions drawn from the Departmental Handbook with options A-D, containing one correct answer and three distracters. The multiple-choice questions were administered as a pre-test, post-test and retention test to Experimental

Group I and Experimental Group II. During the pre-test, the instrument was administered the way it is designed the first time. For the post-test, the questions were reshuffled and administered to the students in order to create an impression that there is a difference from the first one administered. For the retention test, the questions and their answers were also reshuffled again in order to give an impression that the questions were not the same and were administered to both Experimental Group I and Experimental Group II. In order to score the students, one mark was allocated for each correct answer and the overall scores were converted to percentage.

3.4.2 Development of collaborative learning questionnaire (CLQ)

The Collaborative Learning Questionnaire (see appendix E) was designed to check the extent of collaboration amongst the students. It consisted of two sections: A and B.

Section A contained the personal data of the respondents while section B consisted of 20 statements that required their responses. The questionnaire was designed on a fourpoint

Likert scale of Very High Extent (VHE), High Extent (HE), Low Extent (LE) and Very Low Extent (VLE) with a scoring pattern of 4, 3, 2, and 1 respectively.

3.4.3 Development of treatment instrument

3.4.4 Development of telegram learning platform (TLP)

A Telegram group was created by the researcher whereby all the students were added into the platform for an online discussion and delivery of lecture contents in the form of instant messages and online discussions. The students were added by the researcher individually, and a link was also created whereby students joined via the created link.

3.4.5 Development of whatsapp learning platform (WLP)

An online WhatsApp group was created by the researcher whereby all the students were added into the platform for an online discussion and delivery of lecture contents in the form of instant messages and online discussions. The students were added by the researcher individually, and a link was also created whereby students joined via the created link.

3.5 Validation of Instruments

3.5.1 Validity of micro-teaching achievement test (MTAT)

The Micro-teaching Achievement Test (MTAT) was validated by two lecturers from the Department of Educational Technology, Federal University of Technology Minna and one expert in the field of Curriculum and Instruction from University of Abuja (see appendix F). The experts checked the suitability of the instrument in order to determine its content arrangement, clarity and appropriateness in terms of what it seeks to measure, and also to determine whether the questions have been drafted to cover the construct they intend to

measure. Thereafter, all the corrections and observations pointed out were carefully effected accordingly in the final draft of the instrument.

3.5.2 Validity of collaborative learning questionnaire (CLQ)

The Collaborative Learning Questionnaire (CLQ) was validated by an Educational Psychologist from University of Abuja since it is a psychological construct, in order to determine the suitability and appropriateness of the items in terms of what they seek to measure (see appendix F). All the observations and corrections pointed out were then carefully effected to produce the final copy of the instrument.

3.6 Reliability of Instruments

3.6.1 Reliability of micro-teaching achievement test (MTAT)

Micro-teaching Achievement Test (MTAT) was pilot tested on twenty 300 level students of Faculty of Education of National Open University of Nigeria (NOUN) offering micro-teaching in the Gombe study centre using split-half method of reliability, and a co-efficient value of 0.91 (see appendix G) was obtained using Pearson Product Moment Correlation (PPMC) formula. According to Ali *et al.* (2019), any reliability figure in the range of 0.7 and above is considered to be acceptable.

3.6.2 Reliability of collaborative learning questionnaire (CLQ)

The Collaborative Learning Questionnaire (CLQ) was pilot tested on twenty 300 level Faculty of Education students of National Open University of Nigeria (NOUN) offering micro-teaching in the Gombe study centre in order to check the internal consistency of the items, and a reliability index of 0.84 (see appendix G) was obtained using Cronbach alpha statistics.

3.7 Method of Data Collection

The researcher visited the selected universities with a letter of introduction from the Head of Department, Educational Technology, Federal University of Technology, Minna, Niger State (see appendix H). Upon receiving permission to proceed from the Heads of Department of the selected schools, the researcher met with the course lecturers of the course under investigation and briefed them about the research and what the researcher intends to investigate. After that, during the first week, the researcher had a formal meeting with the students and briefed them about the study, requesting their cooperation, whereby the students were added into Experiment Group I (Telegram Learning Platform) and Experimental Group II (WhatsApp Learning Platform), having obtained their contact information from the course lecturers as well as the course representatives.

A pre-test was administered in the second week in order to determine the entry level of the students. The online interaction took place in the third, fourth and fifth weeks, whereby various Micro-teaching contents in the form of online texts and instant messages were dropped by the researcher at least twice a week. In order to create an online collaborative learning environment, the students were grouped into various subgroups based on their teaching subjects where they worked together in groups. The researcher also dropped assignments that required the students to work in groups and to discuss online in order to provide solutions. By the sixth week, a post test was administered by the researcher, which was then followed, in the same week, by the administration of the Collaborative Learning Questionnaire (CLQ) in order to measure the level of collaboration amongst the students. Another test was administered after two weeks in order to determine the level of retention.

3.8 Method of Data Analysis

Descriptive statistics using mean and standard deviation was used to answer the research questions while inferential statistics involving t-test was used to test the null hypotheses at 0.05 level of significance. Research questions one to six were answered using mean and standard deviation. In order to analyse research questions seven and eight, mean and standard deviation were used along a decision key of 1.0-1.49, 1.5-2.49, 2.5-3.49 and 3.5-4.0 for Very Low Extent (VLE), Low Extent (LE), High Extent (HE) and Very High Extent (VHE) respectively. Research hypotheses one to six were analysed using inferential statistics involving an independent sample t-test such that when $p<0.05$, the hypothesis was rejected and in the event that $p>0.05$, the hypothesis was accepted. As for research hypothesis seven, the data was converted from an ordinal to interval scale on Microsoft Excel, which was then imported to SPSS software in order to be compared using t-test statistics. The data were analysed using SPSS software version 25.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents all the relevant data for answering the research questions as well as testing the null hypotheses that were used in the study. The results and analyses are therefore presented below.

4.1 Answering of Research Questions

4.1.1 Research question one: What is the difference in the mean achievement scores of undergraduate students taught micro-teaching using telegram and whatsapp-enhanced instruction in collaborative learning settings?

Table 4.1: Mean and Standard Deviation of the Pre-test and Post-test Scores of Experimental Group I and II

Group	N	Pre-test		Post-test		Mean Gain	
		$\bar{X}$	SD	$\bar{X}$	SD		
Telegram	117	34.87	5.46	66.57	11.94	31.70	
WhatsApp	165	36.55	4.33	76.35	7.31	39.80	

The data presented on table 4.1 shows the mean and standard deviation of the pre-test and post-test achievement scores of both experimental group I (Telegram) and experimental group II (WhatsApp). From the table, Experimental group I (Telegram) had a mean and

standard deviation of 34.87 and 5.46 respectively in the pre-test; and a mean score of 66.57 and a standard deviation of 11.94 in the post-test. The pre-test and post-test mean difference was 31.70. Also, from the table, it can be seen that experimental group II (WhatsApp) had a mean of 36.55 and a standard deviation of 4.33 in the pre-test and a mean score of 76.35 and a standard deviation of 7.31 in the posttest. The pre-test and post-test +mean difference was 39.80 while the marginal mean difference was 8.1. With this result, therefore, the students in experimental group II

(WhatsApp) performed better with a higher mean, than those in experimental group I (Telegram).

4.1.2 Research question two: What is the difference in the mean retention scores of undergraduate students taught micro-teaching using telegram and whatsapp-enhanced instruction in collaborative learning settings?

Table 4.2: Mean and Standard Deviation of the Post-test and Retention Scores of Experimental Group I and II

Group	N	Post-test		Retention		Mean Difference
		$\bar{X}$	SD	$\bar{X}$	SD	
Telegram	117	66.57	11.94	64.29	10.86	2.28
WhatsApp	165	76.35	7.31	73.27	6.39	3.08

Table 4.2 above shows the post-test and retention scores of experimental group I (Telegram) and experimental group II (WhatsApp). From the table, experimental group I (Telegram) had a mean score of 66.57 and a standard deviation of 11.94 in the posttest and a mean of 64.29 and a standard deviation of 10.86 in the retention test. The mean difference between the post-test and retention scores in experimental group I was 2.28. Also, from the table, experimental group II (WhatsApp) had a mean of 76.35 and a

standard deviation of 7.31 in the post-test and a mean of 73.27 and a standard deviation of 6.39 in the retention test. The mean difference in the post-test and retention scores of experimental group II (WhatsApp) was 3.08 while the marginal difference was 0.8. With this result, experimental group II (WhatsApp), with a higher mean retention gain of 3.08, retained more than the experimental group I (Telegram).

4.1.3 Research question three: What is the difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using telegramenhanced instruction in collaborative learning settings?

Table 4.3: Mean and Standard Deviation of the Pre-test and Post-test Scores of Male and Female Students Exposed to Telegram Learning Platform

Group	N	Pre-test		Post-test		Mean Difference
		$\bar{X}$	SD	$\bar{X}$	SD	
Male	61	36.87	3.48	73.89	8.11	37.02
Female	56	34.56	4.61	71.29	9.44	36.73

Table 4.3 above shows the pre-test and post-test scores of male and female students in experimental group I (Telegram). From the table, male students had a mean score of 36.87 and a standard deviation of 3.48 in the pre-test; and a mean of 73.89 and a standard deviation of 8.11 in the post-test. The mean difference between the pre-test and post-test scores of male students in experimental group I was 37.02. Also, from the table, female students had a mean of 34.56 and a standard deviation of 4.61 in the pre-test; and a mean of 71.29 and a standard deviation of 9.44 in the post-test. The mean difference in the pre-test and post-test scores of female students in the experimental group I was 36.73. It can

therefore be concluded that the male students had a slightly higher achievement than their female counterpart.

4.1.4 Research question four: What is the difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using whatsappenhanced instruction in collaborative learning settings?

Table 4.4: Mean and Standard Deviation of the Pre-test and Post-test Scores of Male and Female Students Exposed to WhatsApp Learning Platform

Group	N	Pre-test		Post-test		Mean Difference
		$\bar{X}$	SD	$\bar{X}$	SD	
Male	86	28.49	5.02	67.08	10.65	38.59
Female	79	30.39	3.95	70.76	8.04	40.37

Table 4.4 above shows the pre-test and post-test scores of male and female students in experimental group II (WhatsApp). From the table, male students had a mean score of 28.49 and a standard deviation of 5.02 in the pre-test and a mean of 67.08 and a standard deviation of 10.65 in the post-test. The mean difference between the pre-test and post-test scores of male students in experimental group II was 38.59 Also, from the table, female students had a mean of 30.39 and a standard deviation of 3.95 in the pretest and a mean of 70.76 and a standard deviation of 8.04 in the post-test. The mean difference in the pre-test and post-test scores of female students in the experimental group II was 40.37. It can therefore be concluded that the female students had a slightly higher achievement than their male counterpart.

4.1.5 Research question five: What is the difference in the mean retention scores of male and female undergraduate students taught micro-teaching using telegram-enhanced instruction in collaborative learning settings

Table 4.5: Mean and Standard Deviation of the Post-test and Retention Scores of Male and Female Students Exposed to Telegram Learning Platform

Group	N	Post-test		Retention		Mean Difference
		$\bar{X}$	SD	$\bar{X}$	SD	
Male	61	73.89	8.11	72.34	2.94	1.55
Female	56	71.29	9.44	70.67	5.88	0.62

Table 4.5 above shows the post-test and retention scores of male and female students in experimental group I (Telegram). From the table, male students had a mean score of 73.89 and a standard deviation of 8.11 in the post-test and a mean of 72.34 and a standard deviation of 2.94 in the retention test. The mean difference in the post-test and retention scores of male students in experimental group I was 1.55. Also, from the table, female students had a mean of 71.29 and a standard deviation of 9.44 in the post-test and a mean of 70.76 and a standard deviation of 5.88 in the retention test. The mean difference in the post-test and retention scores of female students in the experimental group I was 0.62. It can therefore be concluded that the male students had a slightly higher retention.

4.1.6 Research question six: What is the difference in the mean retention scores of male and female undergraduate students taught micro-teaching using whatsappenhanced instruction in collaborative learning settings?

Table 4.6: Mean and Standard Deviation of the Post-test and Retention Scores of Male and Female Students Exposed to WhatsApp Learning Platform

Group	N	Post-test		Retention		Mean Difference
		$\bar{X}$	SD	$\bar{X}$	SD	
Male	86	67.08	10.65	65.75	10.08	1.33
Female	79	70.76	8.04	68.84	8.79	1.92

Table 4.6 above shows the post-test and retention scores of male and female students in experimental group II (WhatsApp). From the table, male students had a mean score of 67.08 and a standard deviation of 10.65 in the post-test and a mean of 65.75 and a standard deviation of 10.08 in the retention test. The mean difference in the post-test and retention scores of male students in experimental group II was 1.33. Also, from the table, female students had a mean of 70.76 and a standard deviation of 8.04 in the posttest and a mean of 68.84 and a standard deviation of 8.79 in the retention test. The mean difference in the post-test and retention scores of female students in the experimental group II was 1.92. It can therefore be concluded that the female students had a slightly higher retention.

4.1.7 Research question seven: What is the difference in the mean collaboration scores of undergraduate students taught micro-teaching using telegram and whatsapp-enhanced instruction in collaborative learning settings?

Table 4.7: Mean and Standard Deviation of Students' Responses on the Extent of Collaboration on Telegram Learning Platform

S/N	Items	$\bar{X}$	SD	Decision
1	Discussion with colleagues	2.88	0.67	High Extent
2	Active participation with peers	3.78	0.58	Very High Extent
3	Learning from colleagues through active participation	2.84	0.75	High Extent
4	Expressing myself more than normal classroom situation	2.95	0.54	High Extent
5	Recalling information faster through group discussions	2.89	0.59	High Extent
6	Interacting with my colleagues on topics I don't understand	2.64	0.72	High Extent
7	Increasing my performance during exams through group discussions with colleagues	2.57	1.16	High Extent
8	Increasing my confidence level while learning on the platform	2.59	1.19	High Extent
9	Increasing the friendship bond with my colleagues through active interaction	3.68	0.91	Very High Extent
10	Obtaining first-hand information about my studies	2.58	1.16	High Extent
11	Receiving immediate feedback from my colleagues and teacher	2.92	0.49	High Extent
12	Learning through the discussions of others even without commenting	3.88	0.52	Very High Extent
13	Privately reaching out to friends who understand concepts better to put me through	2.94	0.43	High Extent
14	Airing my own opinion about the topic being discussed	2.76	0.67	High Extent
15	Interacting with my teacher a lot which helps me to understand very well	2.73	0.61	High Extent
16	Increasing the student-teacher interaction	3.91	0.41	Very High Extent
17	Enhancing the relationship with my teacher as a result of constant interaction	2.59	1.02	High Extent
18	Responding to questions posed by my teacher quickly	3.63	0.39	Very High Extent
19	Receiving immediate feedback from my teacher whenever I ask questions	2.98	0.83	High Extent
20	Obtaining learning contents frequently from my teacher	2.74	0.75	High Extent
	Grand Mean	**3.01**		**High Extent**

Decision key: 1.0-1.49: Very Low Extent; 1.5-2.49: Low Extent; 2.5-3.49: High Extent; 3.5-4.0: Very High Extent

Table 4.7 shows the mean and standard deviation of students' responses on the extent of collaboration on telegram learning platform. The table revealed that all the responses of the students fall within the range of High Extent (2.5-3.49) and Very High Extent (3.5-4.0). Furthermore, the table revealed a grand mean of 3.01 which falls under the range of high extent. This therefore means that the students demonstrated some levels of collaboration to a high extent on the telegram learning platform.

Table 4.8: Mean and Standard Deviation of Students' Responses on the Extent of Collaboration on WhatsApp Learning Platform

S/N	Items	$\bar{X}$	SD	Decision
1	Discussion with colleagues	3.92	0.41	Very High Extent
2	Active participation with peers	3.82	0.69	High Extent
3	Learning from colleagues through active participation	3.90	0.38	High Extent
4	Expressing myself more than normal classroom situation	3.83	0.56	High Extent
5	Recalling information faster through group discussions	2.95	0.72	High Extent
6	Interacting with my colleagues on topics I don't understand	3.88	0.55	High Extent
7	Increasing my performance during exams through group discussions with colleagues	2.76	0.71	High Extent
8	Increasing my confidence level while learning on the platform	3.79	0.49	Very High Extent
9	Increasing the friendship bond with my colleagues through active interaction	3.84	0.59	Very High Extent
10	Obtaining first-hand information about my studies	3.55	0.63	Very High Extent
11	Receiving immediate feedback from my colleagues and teacher	3.93	0.43	Very High Extent
12	Learning through the discussions of others on even without commenting	3.07	0.52	High Extent
13	Privately reaching out to friends who understand concepts better to put me through	3.89	0.48	Very High Extent
14	Airing my own opinion about the topic being discussed	3.68	0.57	Very High Extent

15	Interacting with my teacher a lot which helps me to understand very well	3.94	0.31	Very High Extent
16	Increasing the student-teacher interaction	2.79	0.93	High Extent
17	Enhancing the relationship with my teacher as a result of constant interaction	2.81	1.02	High Extent
18	Responding to questions posed by my teacher quickly	2.53	0.89	High Extent
19	Receiving immediate feedback from my teacher whenever I ask questions	2.66	0.91	High Extent
20	Obtaining learning contents frequently from my teacher	2.87	0.75	High Extent
	Grand Mean	**3.37**		**High Extent**

Decision key: 1.0-1.49: Very Low Extent; 1.5-2.49: Low Extent; 2.5-3.49: High Extent; 3.54.0: Very High Extent

Table 4.8 shows the mean and standard deviation of students' responses on the extent of collaboration on WhatsaApp learning platform. The table revealed that all the responses of the students fall within the range of High Extent (2.5-3.49) and Very High Extent (3.5-4.0). The table further revealed a grand mean of 3.37 that falls under the range of high extent. This therefore means that the students demonstrated some levels of collaboration to a high extent on the WhatsApp learning platform.

4.2 Testing of Null Hypotheses

4.2.1 Hypothesis one: There is no significant difference in the mean achievement scores of undergraduate students taught micro-teaching using telegram and whatsappenhanced instruction in collaborative learning settings.

In order to test hypothesis one, independent sample t-test was used to analyse the scores of the two groups as presented in table 4.9.

Table 4.9: Independent Sample T-test Result of the Mean Achievement Scores of Students Taught Micro-teaching using Telegram and WhatsApp Learning Platform

Group	N	$\bar{X}$	SD	Df	t-value	p-value	Decision
Telegram	117	66.57	11.94				
				280	3.264	.000	Rejected
WhatsApp	165	76.35	7.31				

Significant at 0.05 ($p<0.05$)

Table 4.9 shows the independent sample t-test result of the mean achievement scores of students taught micro-teaching using Telegram and WhatsApp learning platform. From the table, it can be observed that Telegram had a mean of 66.57 and standard deviation of 11.94. WhatsApp had a mean of 76.35 and a standard deviation of 7.31. Also, t= 3.264, df= 280 and p-value= .000. Therefore, since $p<0.05$, the null hypothesis is hereby rejected. This means that there is a significant difference in the mean achievement scores of the two groups in favour of the WhatsApp platform.

4.2.2 Hypothesis two: There is no significant difference in the mean retention scores of undergraduate students taught micro-teaching using telegram and whatsapp-enhanced instruction in collaborative learning settings.

In order to test hypothesis two, independent sample t-test was used to analyse the scores of the two groups as presented in table 4.10.

Table 4.10: Independent Sample T-test Result of the Mean Retention Scores of Students Taught Micro-teaching using Telegram and WhatsApp Learning Platform

Group	N	$\bar{X}$	SD	Df	t-value	p-value	Decision
Telegram	117	64.29	10.86				
				280	4.292	.000	Rejected
WhatsApp	165	73.27	6.39				

Significant at 0.05 (p<0.05)

Table 4.10 shows the independent sample t-test result of the mean retention scores of students taught micro-teaching using Telegram and WhatsApp learning platform. From the table, it can be observed that Telegram had a mean retention of 64.29 and standard deviation of 10.86. WhatsApp had a mean retention of 73.27 and a standard deviation of 6.39. Also, t= 4.292, df= 280 and p-value= 0.000. Therefore, since p<0.05, the null hypothesis is hereby rejected. This means that there is a significant difference in the mean retention scores of the two groups in favour of the WhatsApp platform.

4.2.3 Hypothesis three: There is no significant difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using telegram-enhanced instruction in collaborative learning settings.

In order to test hypothesis three, independent sample t-test was used to analyse the scores of the two groups as presented in table 4.11.

Table 4.11: Independent Sample T-test Result of the Mean Achievement Scores of Male and Female Students Taught Micro-teaching using Telegram

Group	N	$\bar{X}$	SD	Df	t-value	p-value	Decision
Male	61	73.89	8.11				
				115	2.571	.297	Accepted
Female	56	71.29	9.44				

Not significant at 0.05 (p>0.05)

Table 4.11 shows the independent sample t-test of the mean achievement of male and female students exposed to Telegram platform. From the table, it can be observed that the

male students had a mean of 73.89 and standard deviation of 8.11. Female students had a mean of 71.29 and a standard deviation of 9.44. Also, t= 2.571, df= 115 and pvalue= .297. Therefore, since p>0.05, the null hypothesis is hereby accepted. This means that there is no significant difference in the mean achievement scores of male and female students taught using telegram platform.

4.2.4 Hypothesis four: There is no significant difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using whatsapp-enhanced instruction in collaborative learning settings.

In order to test hypothesis four, independent sample t-test was used to analyse the scores of the two groups as presented on table 4.12.

Table 4.12: Independent Sample T-test Result of the Mean Achievement Scores of Male and Female Students Taught Micro-teaching using WhatsApp

Group	N	$\bar{X}$	SD	Df	t-value	p-value	Decision
Male	86	67.08	10.65	163	3.671	.195	Accepted
Female	79	70.76	8.04				

Not significant at 0.05 (p>0.05)

Table 4.12 shows the independent sample t-test result of the mean achievement scores of male and female students taught micro-teaching using WhatsApp learning platform. From the table, male students had a mean of 67.08 and a standard deviation of 10.65 while the female students had a mean of 70.76 and a standard deviation of 8.04. Also, it can be observed that t = 3.671, df= 163 and p-value= .195. Since p>0.05, therefore the null

hypothesis is hereby accepted. This means that there is no significant difference in the mean achievement scores of male and female students taught using WhatsApp platform.

4.2.5 Hypothesis five: There is no significant difference in the mean retention scores of male and female undergraduate students taught micro-teaching using telegram-enhanced instruction in collaborative learning settings.

In order to test hypothesis five, independent sample t-test was used to analyse the scores of the two groups as presented in table 4.13.

Table 4.13: Independent Sample T-test Result of the Mean Retention Scores of Male and Female Students Taught Micro-teaching using Telegram

Group	N	$\bar{X}$	SD	Df	t-value	p-value	Decision
Male	61	72.34	2.94				
				115	5.274	.386	Accepted
Female	56	70.67	5.88				

Not significant at 0.05 (p>0.05)

Table 4.13 shows the independent sample t-test result of the mean retention scores of male and female students taught micro-teaching using telegram learning platform. From the table, male students had a mean of 72.34 and a standard deviation of 2.94 while the female students had a mean of 70.67 and a standard deviation of 5.88. It can also be observed that t= 5.274 and p-value= .386. Since p>0.05, therefore the null hypothesis is hereby accepted. This means that there is no significant difference in the mean retention scores of male and female students taught using Telegram platform.

4.2.6 Hypothesis six: There is no significant difference in the mean retention scores of male and female undergraduate students taught micro-teaching using whatsappenhanced instruction in collaborative learning settings.

In order to test hypothesis six, independent sample t-test was used to analyse the scores of the two groups as presented in table 4.14.

Table 4.14: Independent Sample T-test Result of the Mean Retention Scores of Male and Female Students Taught Micro-teaching using WhatsApp

Group	N	$\bar{X}$	SD	Df	t-value	p-value	Decision
Male	86	65.75	10.08				
				163	4.071	.000	Rejected
Female	79	68.84	8.79				

Significant at 0.05 ($p<0.05$)

Table 4.14 shows the independent sample t-test result of the mean retention scores of male and female students taught micro-teaching using WhatsApp learning platform.

From the table, it can be observed that male students had a mean of 65.75 and a standard deviation of 10.08 while female students had a mean of 68.84 and a standard deviation of 8.79. It can also be observed that t= 4.071, df = 163 and p-value= .000. Since $p<0.05$, therefore the null hypothesis is hereby rejected. This means that there is a significant difference in the mean retention scores of male and female students taught using WhatsApp platform in favour of the female students.

4.2.7 Hypothesis seven: There is no significant difference in the mean collaboration scores of undergraduate students taught micro-teaching using telegram and whatsappenhanced instruction in collaborative learning settings.

In order to test hypothesis seven, independent sample t-test was used to analyse the scores of the two groups as presented in table 4.15.

Table 4.15: Independent Sample T-test Result of the Extent of Collaboration among Students Taught using Telegram and WhatsApp Platform

Group	N	$\bar{X}$	SD	Df	t-value	p-value	Decision
Telegram	117	70.14	7.57	280	5.217	.000	Rejected
WhatsApp	165	74.55	6.08				

Significant at 0.05 ($p<0.05$)

Table 4.15 shows the independent sample t-test result of the extent of collaboration among the students taught using telegram and WhatsApp platforms. From the table, it can be observed that Telegram had a mean of 70.14 and a standard deviation of 7.57 while WhatsApp had a mean of 74.55 and a standard deviation of 6.08. It can also be seen that t= 5.217, df= 280 and p-value= .000. Since $p<0.05$, therefore the null hypothesis is hereby rejected. This means that there is a significant difference in the extent of collaboration of the students in the two groups in favour of the WhatsApp learning platform. It shows that the students in the WhatsApp platform showed high level of collaboration more than their counterpart in the telegram platform.

4.3 Summary of Findings

1. There is a significant difference in the mean achievement scores of students taught micro-teaching using telegram and WhatsApp-enhanced instruction in collaborative learning settings in favour of the WhatsApp platform.

2. There is a significant difference in the mean retention scores of students taught micro-teaching using telegram and WhatsApp-enhanced instruction in collaborative learning settings in favour of the WhatsApp platform.

3. There is no significant difference in the mean achievement scores of male and female students taught micro-teaching using Telegram platform in collaborative learning settings.

4. There is no significant difference in the mean achievement scores of male and female students taught micro-teaching using WhatsApp platform in collaborative learning settings.

5. There is no significant difference in the mean retention scores of male and female students taught micro-teaching using Telegram platform in

   collaborative learning settings.

6. There is a significant difference in the mean retention scores of male and female students taught micro-teaching using WhatsApp platform in

   collaborative learning settings in favour of the female students.

7. There is a significant difference in the extent of collaboration of microteaching students in the two groups in favour of the WhatsApp learning platform.

4.4 Discussion of Findings

The finding on the effect of Telegram and WhatsApp-enhanced instruction in collaborative learning settings on academic achievement of students in micro-teaching revealed that the students exposed to WhatsApp learning platform in collaborative learning settings performed better than those in Telegram learning platform. The result of the corresponding hypothesis one was tested and it was rejected, which therefore means a significant difference existed in the mean scores of the two groups in favour of WhatsApp learning platform. The significant difference in favour of WhatsApp was due to the level of active participation, timely response and prompt interaction which the students on the

WhatsApp platform displayed and which manifested in their achievement, unlike the Telegram platform which had slow response and interaction.

This finding is therefore in agreement with Basma (2013) who reported that students' vocabulary and word choice performance improved significantly when WhatsApp was used. It is also in tandem with the study of Amry (2014) who reported that students' achievement improved a lot when mobile device using WhatsApp was used as a medium of instruction. The finding is also in agreement with Sahan *et al.* (2016) whose study revealed that the performance of the students increased tremendously using WhatsApp platform. The result revealed that the students found WhatsApp platform to be very useful when it comes enhancing interaction and communication as well as motivation. It is equally in line with the findings of Liya and Dede (2017) whose study revealed that students' achievement in reading comprehension increased significantly when taught using WhatsApp platform in a blended settings. Going forward, the finding is in consonance with that of Arash *et al.* (2018) whose study revealed that students' vocabulary knowledge increased when taught using WhatsApp platform. Confirming the findings of Ruba *et al.* (2018), which revealed that students' paraphrasing as well as summary writing skills improved a lot when WhatsApp is used in combination with email, this study also revealed that students' performance increased while using WhatsApp platform. Additionally, the outcome also tallies with that of Cetinkaya and Sutco (2018) who taught students English vocabulary using Facebook and WhatsApp platforms and the result revealed that students' achievement increased better using WhatsApp, followed by Facebook, then the conventional platform. This finding, once again, falls in line with Hassan and Ahmed (2018) who found out that students' performance increased by using WhatsApp because students were found to interact with one another through chats, video calls document sharing etc. Furthermore, the finding agrees with the findings of Gurluyer (2019) who reported that students' English vocabulary increased after they were exposed

to WhatsApp platform and that they showed high level of interaction among themselves. The finding also goes in the same side with that of Ofoka (2019) whose study revealed that students' achievement in agriculture increased tremendously using WhatsApp as compared with Facebook, blog and conventional method. The Sidak post-hoc test of Ofoka (2019) further revealed that

WhatsApp improved students' performance more than blog and conventional method; however, a significant difference was not found when compared with Facebook platform. Finally, the finding subscribes to that of Almogheerah (2020) whose study revealed that students' idiomatic expression achievement increased using WhatsApp, and that the students demonstrated collaborative skills which help their overall performance.

However, this finding is in disagreement with Berenji and Saeidi (2017) whose study revealed that students exposed to instruction using telegram platform enjoyed a better achievement and motivation and equally demonstrated high collaborative ability. It is equally not in tandem with Xobande (2017) whose study revealed that students' English pronunciation improved when exposed to instruction on telegram. Also, the finding is not in tandem with Ilobeneke *et al.* (2018a) whose study compared Facebook and WhatsApp supported instruction and discovered that there was no significant difference in students' achievement in educational technology exposed to WhatsApp and Facebook instruction. This finding is also not in line with that of Zarei (2017) whose study revealed that students' knowledge of vocabulary significantly improved using Telegram platform. It also disagrees with the result of Movafagh (2017) who discovered that students' vocabulary increased significantly using telegram platform. Going further, this finding is not in concordant with Nuzulul-Wahju (2018) whose study revealed that students' writing skills improved tremendously using telegram. It also disagrees with the findings of Nabati

(2018) who discovered that the writing accuracy of students increased significantly after receiving instructions using telegram platform as a medium of instruction. Furthermore, the finding disagrees with that of Fathi (2018) who compared blended learning through Telegram and Instagram to increase students' reading comprehension and discovered that using Telegram and Instagram increased students' performance more than the conventional method; and when telegram and WhatsApp were compared in the post-hoc test, it was discovered that telegram platform performed better than the Instagram platform. Similarly, it disagrees with the findings of Shima and Saeed (2018) which showed that students' vocabulary increased using Telegram. It is also not in congruence with the findings of Saaleni (2018) who reported that students' language pronunciation increased better after using telegram. Furthermore, this finding equally goes in parallel with the discovery of Aghajani and Adloo (2018) who reported that students achievement increased to a very large extent when online cooperative learning using telegram was used to improve students' writing skills in the sense that the students capitalize on the opportunity provided by the telegram platform to stimulate interaction and dialogue with one another. More so, this finding equally disagrees with Azman *et al.* (2018) whose comparative study to check the effectiveness of Quizlet and Telegram platforms which they coined as Qgram revealed that students' performance increased using the Telegram for learning English. It also goes in parallel with the findings of Tabrizi and Onvani (2020) whose discovery stated that students' vocabulary increased significantly when telegram was used as a medium of instruction. Stressing further, the study is not in line with that of Vahdat *et al.* (2020) who discovered that students' collocation knowledge increased when exposed to telegram platform. Finally, the finding also disagrees with Suryati and Adnyana (2020) who reported an increase on the mathematics achievement of students exposed to telegramassisted blended learning platform.

The result on the effect of Telegram and WhatsApp-enhanced instruction in collaborative learning settings on the retention of students in micro-teaching revealed that the students exposed to WhatsApp learning platform in collaborative learning settings retained better than those on Telegram platform. The corresponding hypothesis two was tested and it was rejected, which therefore means a significant difference existed in the mean retention scores of the two groups in favour of WhatsApp learning platform. The high retention exhibited by students on the WhatsApp platform was due to the level of active participation and interaction which the students displayed, thereby forming a lasting cognitive experience on them unlike the Telegram platform where interaction and response was less. Additionally, the students in the WhatsApp platform had a slightly higher retention test scores, indicating that majority of them retained the concepts better than their Telegram counterpart. This finding is therefore in tandem with Gambari and Adamu (2008) who discovered that there was a significant difference in the mean retention scores of students exposed to video-taped instruction. More so, this finding is in congruence with the study of Achor *et al.* (2014) whose study revealed that there was a significant difference in the mean retention scores of students exposed to computer-based instruction. Additionally, this finding falls in line with the findings of Bupo (2019) who discovered that there was a significant difference in the mean retention of students exposed to instruction using MOODLE-supported blended learning strategy and those taught using conventional method. Moreover, this finding aligns with

Ilobeneke *et al.* (2018b) whose study investigated the effect of Facebook and WhatsApp-supported instruction on students' retention in educational technology and discovered that there was a significant difference in the mean retention of those exposed to Facebook, WhatsApp and conventional methods. However, the finding is in disagreement with Xobande (2017) who discovered that there was no significant

difference in the mean retention scores of students taught English pronunciation using Telegram platform. This finding also disagrees with that of Fahimeh and Zahrah (2019) who reported no significant difference in the mean retention scores of students taught English vocabulary using telegram platform. Furthermore, the finding is not in consonance with that of Ofoka (2019) who discovered that there was no significant difference in the mean retention scores of students taught agriculture using Facebook, Blog and WhatsApp platforms.

The result on the effect of Telegram platform in collaborative learning settings on the gender achievement of students in micro-teaching revealed that the male students performed better than the female. In order to check whether the difference was significant or not, the corresponding hypothesis three was tested, and it was accepted. This therefore means that there was no significant difference in the mean scores of both male and female students on the Telegram platform. This finding is in line with Naderi and Akrami (2018) whose study reported that there was no significant difference in the mean achievement of male and female students taught reading comprehension using telegram platform. It is also in agreement with Dambo and Kayii (2018) whose study revealed no significant difference in the performance of male and female students exposed to blended learning strategy. Furthermore, the finding is in congruence with Jimoh *et al.* (2018) who reported that there is no significant difference in the mean achievement of male and female students exposed to three modes of mobile instructional packages. Additionally, the finding equally aligns with that of Kareem *et al.* (2018) whose result revealed that there is no significant difference in the mean achievement of male and female fine arts students taught sculpture using Facebook platform. Finally, this finding goes in concordant with Ofoka (2019) whose study revealed no significant difference in the performance of male and female students exposed to Facebook instruction.

The result on the effect of WhatsApp platform in collaborative learning settings on the gender achievement of students in micro-teaching revealed that the male students performed better than the female. In order to check whether the difference was significant or not, the corresponding hypothesis four was tested and it was subsequently accepted. This therefore means that there was no significant difference in the mean scores of both male and female students exposed to instruction on the WhatsApp platform. This was due to the fact that since the students on the WhatsApp platform generally performed better by displaying high engagement and interaction, male and female students performed at the same levels in the achievement test because they both demonstrated some high levels of interaction, discussion and prompt response to questions. This finding agrees with Bawa and Ibrahim (2016) whose study revealed no significant difference in the achievement of undergraduate students exposed to instruction using blended WhatsApp instruction. It also tallies with Jafari and Chalak

(2016) who reported no significant difference in the performance of male and female students taught vocabulary using WhatsApp platform. Furthermore, the finding also goes in tandem with Ofoka (2019) whose study revealed that there is no significant difference in the achievement of male and female agricultural science students exposed to instruction using WhatsApp, Blog and Facebook platforms. Additionally, the finding concurs with Ilobeneke *et al.* (2018a) whose study found no significant difference in the mean achievement of male and female educational technology students exposed to instruction using WhatsApp and Facebook platform. However, the finding contradicts that of Omar (2021) whose study revealed the existence of a significant difference in the performance of male and female students taught writing and speaking skills using WhatsApp platform. Finally, it also goes in parallel with Safitri (2021) whose study found a significant difference in the performance of male and female staff in favour of the male when exposed to vocabulary test using WhatsApp platform.

The result on the effect of Telegram platform in collaborative learning settings on the retention of male and female micro-teaching students revealed that the male students performed better in the retention test than the female. In order to check whether the difference was significant or not, the corresponding hypothesis five was tested and it was accepted. This therefore means that there was no significant difference in the mean

retention scores of both male and female students exposed to instruction using Telegram platform. This result was possible because interaction and engagement by students was generally low on the Telegram platform which therefore led to both male and female students performing at the same rate in the retention test because the difference in their retention scores was not significant. This finding is in agreement with Gambari and Adamu (2008) whose study revealed no significant gender difference in the mean retention of male and female students exposed to instruction using videotaped instructional strategy. It is also in agreement with that of Achor *et al.* (2013) whose study discovered no significant difference in the mean retention scores of male and female students exposed to instruction using a computer-based instructional strategy. More so, this finding is also in congruence with Gambari *et al.* (2014) whose study revealed that there is no significant difference in the mean retention scores of male and female students exposed to instruction using computer animation and geometry model instruction. Additionally, this finding agrees with that of Ofoka (2019) whose study found no significant difference in the mean retention scores of male and female students exposed to instruction using Facebook and blog instruction. However, this finding is in disagreement with Owodunmi and Ogundola (2013) whose study revealed that there is a significant difference in the mean retention scores of male and female students exposed to electronic instruction using reflective inquiry method in favour of the female. The result on the effect of WhatsApp platform in collaborative learning settings on the retention of male and female micro-teaching students revealed that the female students performed better in the retention test than the male. In order to check whether the difference was significant or not, the corresponding hypothesis six was tested, and it was rejected. This therefore means that there was a significant difference in the mean retention scores of both male and female students exposed to instruction using Telegram platform in favour of the female. This finding is in congruence with Veysel and Ayase (2017) whose study found a significant difference in the mean

retention score of male and female students exposed to instruction using a blended learning strategy. However, this finding is not in agreement with Ajai and Imoko (2015) whose study revealed that male and female students did not differ in their retention scores when exposed to instruction using a problem-based learning approach. Going further, it is also not in tandem with Ofoka (2019) whose study revealed that there is no significant difference in the mean retention scores of male and female students exposed to instruction using WhatsApp platform. Moreover, this finding does not equally agree with Eze *et al.* (2016) whose study found no significant difference in the mean retention scores of male and female students taught financial accounting using problem-based teaching method. Finally, the finding does not also fall in line with Bupo (2019) whose study found no significant difference in the mean retention scores of male and female accounting students exposed to instruction using MOODLE-based blended learning approach.

The result on the extent of collaboration in both Telegram and WhatsApp platform revealed that while the two groups showed some high level of collaboration to a high extent, nonetheless, those on WhatsApp platform had higher level of collaboration than Telegram platform. In order to check whether the mean difference was significant or not, the corresponding hypothesis seven was tested and it was rejected. This therefore means that the students on WhatsApp platform showed a high level of collaboration to a large extent amongst themselves through interaction with their peers and tutors than those on telegram. This finding was possible because the WhatsApp platform had a much better interaction, engagement and prompt response to questions and online engagement than the Telegram platform. Additionally, just like they performed better in their achievement, the responses of the students on the WhatsApp platform equally revealed that they had a significantly higher grand mean than their Telegram counterpart. This finding is in line with Chou and Chen (2008) who measured students' engagement in online collaborative learning and

discovered that the use of web 2.0 social media technological tool motivated the students to collaborate and learn together through interaction with colleagues thereby enhancing learning outcome. The finding is also in tandem with Troussas *et al.* (2013) who measured the extent of collaborative learning through group interaction in a mobile-assisted multiple language settings and discovered that students interacted themselves as peers, discussed complex problems with peers and used the knowledge generated from the collaborative groups to answer questions posed to them. Going further, the finding is in conformity with that of AlRahimi and Othman (2013) whose study discovered that social media collaborative learning significantly enhanced academic performance through interactions with peers and teachers as well as through active group engagement. Also, it is in concordant with Bozanta and Mardikyan (2017) who used a theoretical structural equation modelling to determine the effect of social media on collaborative learning and the result revealed that social media usage improves peer interaction, content engagement as well as student-teacher interaction. The finding further revealed that perceived ease of use is a predictor of perceived usefulness; therefore, students find social media to be very interesting for educational purposes because of the collaboration it enhances. The finding also agrees with Ibtehal and Fawzi (2013) who stated that WhatsApp platform enhances interaction with colleagues, interaction with tutors, and also enables students to interact and express themselves freely during instruction online. Furthermore, this finding is in conformity with Bawa and Ibrahim (2016) whose study revealed that collaborative learning through social media like WhatsApp platform plays a vital role in improving students' performance. Finally, this finding is in congruence with that of Udenze and Oshionebo (2020) whose study investigated the extent to which WhatsApp platform could be used to facilitate collaborative learning and the result revealed that students used WhatsApp platform for educational purposes through interaction with colleagues and tutors, thereby enhancing their learning.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

From the finding of this study, it was concluded that even though the students in both Telegram and WhatsaApp platform performed well in collaborative learning settings, the students on WhatsApp platform performed better than those on Telegram. It was also concluded that the students on WhatsApp platform retained the concepts better than those on Telegram platform. The study also revealed the influence of gender in the achievement and retention of the two groups such that while there is no significant gender difference in the achievement of male and female students in both Telegram and WhatsApp platform, a significant gender difference existed in the retention scores of male and female students on WhatsApp platform. Additionally, while it was established that the two groups displayed some high levels of collaboration, but the

students on the WhatsApp platform showed better collaboration than those on Telegram platform due to the level of active participation, timely response and prompt collaboration that ensued.

5.2 Recommendations

Based on the findings of this study, the following recommendations are hereby made:

1. Lecturers should adopt the use of social media tools like Telegram and WhatsApp during classroom instruction because they are engaging, interesting, and flexible.
2. Lecturers should adopt the use of social media collaborative learning approach since students are always on their phones, they can equally use it for instructional purposes.
3. Micro-teaching lecturers should deploy the use of social media tools like Telegram and WhatsApp to cover for large classroom sizes, lack of microteaching laboratory and other tight schedules.

5.3 Contributions to Existing Knowledge

The study has successfully tested the design and experimentation of Telegram and WhatsApp platforms as an effective instructional medium capable of being used as an online micro-teaching laboratory and this has added to the pool of knowledge and literature in the area of social media collaborative learning. The study has revealed the role of social media collaborative learning in fostering students' achievement and retention. The study has shown that social media platforms like Telegram and WhatsApp have the potential to bridge the individual differences occasioned by gender since both male and female performed relatively the same.

5.4 Suggestions for Further Study

The following suggestions are hereby made:

1. The study was carried out to determine the effect of telegram and WhatsAppenhanced instruction in collaborative learning settings on learning outcomes in micro-teaching among undergraduate in Gombe state. A similar study can be replicated in a different area as well.

2. A similar study can be conducted in other disciplines to determine the effect of telegram and WhatsApp-enhanced instruction in collaborative learning settings on students' achievement and retention in order to add more literature and empirical facts in the area of social media collaborative learning.

3. A research should be conducted to determine the perception, attitude and behavioural intention of pre-service teachers to use Telegram and WhatsApp platforms in collaborative settings for quality instructional delivery.

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APPENDIX A

Table of Specification for Micro-teaching Achievement Test (MTAT)

S/N	CONTENT	LOWER ORDER QUESTIONS (43%)			HIGHER ORDER QUESTIONS (57%)			TOTAL
		KNOW	COMP	APP	ANA	SYN	EVA	
1	Micro-teaching	1	1	1	2	1	2	8
2	Teaching-learning concepts	1	2	1	1	-	-	5
3	Instructional objectives	1	-	1	1	1	1	5
4	Lesson plan	1	-	1	1	1	-	4
5	Instructional resources	-	-	1	1	1	1	4
6	Classroom communication	-	1	-	1	1	1	4
	TOTAL	4	4	5	7	5	5	30
		13			17			

APPENDIX B

Micro-teaching Achievement Test (MTAT) SECTION

A

School:

Level:

Gender:

Instruction: attempt all questions by ticking the correct option from letter A-D.

Time: 30 minutes

SECTION B

1. Which of the following best defines micro-teaching?
   (A) A form of teaching where a student teacher teaches a large audience (B) An instructional technique where student-teachers are trained to teach in a simulated manner where teaching is recorded for feedback and correction (C) A process of breaking teaching into smaller units for easy comprehension (D) All of the above
2. In every effective micro-teaching process, there are --------- stages involved? (A) 2
   (B) 3
   (C) 1
   (D) 4
3. One of the reasons why micro-teaching is recorded include…..?
   (A) For students to receive corrections from peers and supervisors in order to ensure perfection
   (B) For student-teachers to be cheered during instruction
   (C) For teaching-learning to be made easy
   (D) For supervisors to score student-teachers appropriately
4. The following are advantages of micro-teaching to student-teachers except? (A) It enables them with the required skills needed before joining a wider audience
   (B) It provides a practical approach to teaching
   (C) It gives feedback where necessary
   (D) It is too time consuming
5. The following important components make up micro-teaching except?
   (A) Student-teacher
   (B) Feedback mechanism
   (C) Problem identification
   (D) Teaching skills
6. …… is a series of deliberate activities geared towards obtaining a desirable change in the behaviour of learner as a result of experience
   (A) Teaching
   (B) Learning
   (C) Demonstration
   (D) Practicum

7. One special characteristics of micro-teaching that makes it unique is?
   (A) It is real and focuses on the training needed towards accomplishing a task

(B) It brings students together in unity (C) No feedback is necessarily needed
(D) None of the above

8. Why is it necessary for pre-service teachers to teach and re-teach during microteaching exercise?
   (A) It enables them to plan well
   (B) It enables them to be properly access and scrutinize so that correction can be made for mastery
   (C) To increase their mastery of communication
   (D) It enables lessons to be broadcast to audience
9. Which one of these is the goal of micro-teaching according to the National Policy on Education (NPE)?
   (A) It boosts' confidence
   (B) It enhances teaching and learning
   (C) To produce highly qualified motivated, competent and professional teachers at all levels of education
   (D) To encourage high school enrolment rate in teacher-education program
10. Teaching and learning can be said to have achieved its aim when…..?
    (A) Students are involved in tasks
    (B) Skills are imparted to students during instruction
    (C) Information is thoroughly circulated
    (D) There is a desirable change in the behavior of learners due to new experience
11. The major principles of teaching include the following except?
    (A) Simple to complex
    (B) Inquiry to perfection
    (C) Concrete to abstract
    (D) Immediate to distant
12. It is very necessary to plan lesson to be learner-friendly so as to……?
    (A) Arouse the interest and ability of learners
    (B) Maintain proper classroom control
    (C) Communicate effectively and efficiently
    (D) Eliminate large classroom size
13. Every effective teaching-learning process passes through the following stages except? (A) Input stage
    (B) Perception stage
    (C) Activity stage
    (D) Reward stage
14. The term behavioural objectives can best be described as….?
    (A) Learning characteristics during teaching
    (B) Classroom management outcomes
    (C) Statement of expected outcomes after teaching-learning has taken place (D) None of the above
15. Instructional objectives are usually stated in…?
    (A) General and specific terms
    (B) Specific and divergent terms
    (C) General and multi-dimensional terms
    (D) Single to multiple
16. The learning objective that describes a broad learning outcome is known as…..?
    (A) Specific objective

(B) General objective
(C) Dimensional objective
(D) Divergent objective

17. Specific objectives are usually stated using action verbs in order to…..?
    (A) Have a clear purpose of learning
    (B) Ensure broad outcome is achieved
    (C) Simplify learning and break them into smaller units
    (D) Determine observable and measureable outcomes
18. For any behavioural objectives to have any meaningful value, it must be…?
    (A) Stated in clear and unambiguous terms
    (B) Specific
    (C) Relevant to subject matter
    (D) All of the above
19. Instructional objectives are considered to be very vital ingredients during teaching and learning because……?
    (A) They make learning quite easy for students
    (B) They save time and energy
    (C) They give a lesson a clear purpose and direction
    (D) None of the above
20. Lesson plan is defined as……?
    (A) A skeletal framework that guides and directs the teacher during teaching and learning
    (B) A clear plan that guides the learners to learn very well during teaching and learning
    (C) An evaluation technique that enhances teaching and learning
    (D) A systematic analysis of teaching and learning process
21. Which of the following constitutes one of the major components of a lesson plan?
    (A) Teaching, communication, comprehension, and behavioural objectives
    (B) Behavioural objectives, writing, evaluation and conclusion
    (C) Introduction, lesson objectives, teaching aides and lesson presentation
    (D) Development, supervision, recording and practical
22. When designing a lesson plan, it is always important to align evaluation to tally with instructional objectives so as to…?
    (A) Determine whether stated objectives have been achieved or not
    (B) Determine whether learning is student or teacher centered
    (C) Evaluate teaching strategies used during instruction
    (D) None of the above
23. In every teaching-learning process, the importance of entry behavior needs not to be overemphasized because…?
    (A) It enables teachers to measure past knowledge in order to build learning around what students already know
    (B) It measures students perception skills to be used during instruction
    (C) It improves the cognitive skills of learners
    (D) All of the above
24. During every teaching and learning, instructional resources are considered to be very vital if used properly, which of the following is true about them?
    (A) They make learning to be very interesting
    (B) They simplify learning to be student-centered
    (C) They make learning faster to grasp because they stimulate many senses (D) All of the above
25. When an instructional resource appeals to both the sense of sight and hearing, it can be grouped under the following heading….

(A) Perceptual material, visual material and cognitive concepts
(B) Audio, video, and multimedia resources
(C) Computer, word processor, diorama and 3D materials
(D) Programmed instruction, virtual concepts, and blended learning

26. Depending on their usage in the classroom, instructional resources can be broadly classified into……?
(A) Computer assisted packages and animation
(B) Massive open online courses and open educational resources
(C) Projected and non-projected materials
(D) None of the above

27. Classroom communication is very important during teaching due to the following reason…..
(A) It allows students to follow lesson at ease
(B) It enables teachers to plan well during lesson delivery
(C) It enables teachers to know whether their lesson has been grasped or not (D) None of the above

28. Which of the following categories describes the sequential stages of communication process in the classroom?
(A) Communicator, message, medium, receiver and feedback
(B) Feedback, message, receiver, medium and communicator
(C) Receiver, communicator, medium feedback and message
(D) Medium, communicator, receiver, feedback and message

29. During teaching and learning, there are barriers considered to be against effective communication, which amongst this can constitute barrier to communication?
(A) Noise
(B) Language incompetence
(C) Lack of clarity
(D) All of the above

30. In order to improve classroom communication, a competent teacher needs to….?
(A) Ensure silence and make sure students follow attentively
(B) Teach contents repeatedly for easy understanding
(C) Walk round the classroom during teaching
(D) Give frequent assignments and class activities to student

APPENDIX C

Micro-teaching Achievement Test (MTAT) Marking Scheme

1. B
2. D
3. A

4. D
5. C
6. A
7. A
8. B
9. C
10. D
11. B
12. A
13. D
14. C
15. A
16. B
17. D
18. D
19. C
20. A
21. C
22. A
23. A
24. D
25. B
26. C
27. C
28. A
29. D
30. A

APPENDIX D

Questionnaire Filling Request

Department of Educational Technology,
School of Science and Technology Education,
Federal University of Technology, Minna,
Niger State.

Dear Respondent,

QUESTIONNAIRE FILLING REQUEST

I am a researcher carrying out a study on the **Effects of Tlegram and WhatsApp Enhanced Instructions in Collaborative Learning Settings on Learning Outcomes in Micro-teaching among Undergraduates in Gombe State.**

I hereby humbly write to solicit for your cooperation in answering the attached questionnaire, which will enable me to successfully carryout the research. All the information stated will be strictly used for research purpose only.

I will be grateful if you fill the questionnaire to the best of your knowledge. Thank you.

Yours faithfully,

Ibrahim Abba Mohammed

APPENDIX E

Collaborative Learning Questionnaire (CLQ)

SECTION A

School:
Level:
Gender:

Instruction: Please tick the option that best describes your experience working with the social media platform among the options provided: Very Low Extent (VLE); Low Extent (LE); High Extent (HE); Very High Extent (VHE)

SECTION B

Questionnaire on the extent of collaboration among students

S/N	ITEMS	VLE	LE	HE	VHE
1	Discussion with colleagues				
2	Active participation with peers				
3	Learning from colleagues through active participation				
4	Expressing myself more than normal classroom situation				
5	Recalling information faster through group discussions				
6	Interacting with my colleagues on topics I don't understand				
7	Increasing my performance during exams through group discussions with colleagues				
8	Increasing my confidence level while learning on the platform				
9	Increasing the friendship bond with my colleagues through active interaction				
10	Obtaining first-hand information about my studies				
11	Receiving immediate feedback from my colleagues and teacher				
12	Learning through the discussions of others even without commenting				
13	Privately reaching out to friends who understand concepts better to put me through				
14	Airing my own opinion about the topic being discussed				
15	Interacting with my teacher a lot which helps me to understand very well				
16	Increasing the student-teacher interaction				
17	Enhancing the relationship with my teacher as a result of constant interaction				
18	Responding to questions posed by my teacher quickly				
19	Receiving immediate feedback from my teacher whenever I ask questions				
20	Obtaining learning contents frequently from my teacher on the platform				

APPENDIX F

Validation Reports

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF EDUCATIONAL TECHNOLOGY

Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. She/he is conducting a research and you have been selected as one of those with requisite expertise to validate his/her instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality of his/her research instrument. We therefore crave for your assistance in validating the instrument. The completion of the form serves as evidence that the student actually validated the instrument

Thanks for your anticipated assistance.

GENERAL
Dept of Educational Technology
Fed. University of Technology
13 JUL 2021
P.M.B. 65 Minna, N
Sign

Dr. C. S. Tukura

Head of Department (Signature, Date & Official Stamp)

Student's Surname Ibrahim Abba Other Names Mohammed

Registration Number MTech/SSE/2019/10616 Programme Educational Technology

Title of the Instrument Mathematics Achievement Test (MTAT)

ATTESTATION SECTION

Summary of the Remark on the Instrument Satisfactory. The instrument is of good Quality. The minor corrections marked out should be attended to.

I hereby attest that the above named student brought his instrument for validation

Name of Attester Dr. O. C. Fabode

Designation Lecturer

Name and Address of Institution F.U.T. Minna

Phone Number 08069628974 E.- Mail fcemi@futminna.edu.ng

Please comment on the following

1. Appropriateness of the instrument for the purpose it's design for..... Appropriate
2. Clarity and simplicity for the level of the language used..... Clear and simple.
3. Suability for the level of the targeted audience ..... Suitable
4. The extent in which the items cover the topic it meant to cover.....
5. The structuring of the Questionnaire..... Well structured
6. Others (grammatical errors, spelling errors and others..... Minor
7. General overview of the Instrument..... Satisfactory

Suggestions for improving the quality of the Instrument

1. Minor corrections pointed out
2. should be effected.
3. .....
4. .....
5. .....

Name of Validator..... Dr. Oisi Fabelo

Area of Specialization.... Educational Technology

Name of Institution... F.U.T. Minna ...Designation... Lecturer

Signature.....Date... 8/7/2024

Thank You

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF EDUCATIONAL TECHNOLOGY

Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. She/he is conducting a research and you have been selected as one of those with requisite expertise to validate his/her instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality of his/her research instrument. We therefore crave for your assistance in validating the instrument. The completion of the form serves as evidence that the student actually validated the instrument

Thanks for your anticipated assistance.

GENERAL
Dept of Educational Technology
Fed. University of Technology
13 JUL 2021
P.M.B. 65 Minna
Sign

Dr. C. S. Tukur

.....

Head of Department (Signature, Date & Official Stamp)

Student's Surname. IBRAHIM ABBA ..... Other Names MOHAMMED

Registration Number MTECH/SSTE/2019/10616 ... Programme EDUCATIONAL TECHNOLOGY

Title of the Instrument. MICROTEACHING ACHIEVEMENT TEST (MTAT) .....

ATTESTATION SECTION

Summary of the Remark on the Instrument. The instrument captured all the elements/components of Microteaching which to me is apt and acceptable.

I hereby attest that the above named student brought his instrument for validation

Name of Attester. Dr. F. I. V. Iorlaver

Designation. Assoc. Prof. of Curriculum & Instruction

Name and Address of Institution. University of Abuja, Abuja, Nigeria

Phone Number. 08053922618 ..... E.- Mail. emmanuel.iorlaver@uniabuja.edu.com

Please comment on the following

1. Appropriateness of the instrument for the purpose it's design for.....
   ..... Satisfactory.....
2. Clarity and simplicity for the level of the language used.... Okay.....
   .....
3. Suability for the level of the targeted audience ..... Okay.....
   .....
4. The extent in which the items cover the topic it meant to cover... Perfect.....
   .....
5. The structuring of the Questionnaire.... In order of preference.....
   .....
6. Others (grammatical errors, spelling errors and others.. Well taken care
   of.....
7. General overview of the Instrument... The candidate, based on the views above can go ahead and administer the instrument.

Suggestions for improving the quality of the Instrument

1. .....
2. .....
3. .....
4. .....
5. .....

Name of Validator. Dr E. I. V. Iorliam.....

Area of Specialization... Curriculum and Instruction.....

Name of Institution. University of Uyo..... Designation. Associate Prof.

Signature..... Date. 2/9/2021

Thank You

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF EDUCATIONAL TECHNOLOGY

Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. She/he is conducting a research and you have been selected as one of those with requisite expertise to validate his/her instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality of his/her research instrument. We therefore crave for your assistance in validating the instrument..The completion of the form serves as evidence that the student actually validated the instrument

Thanks for your anticipated assistance.

GENERAL
Dept of Educational Technology
Fed. University of Technology
13 JUL 2021
P.M.B. 65 Minna
Sign

Dr. C. S. Tukura
.....
Head of Department (Signature, Date & Official Stamp)

Student's Surname IBRAHIM ABBA ..... Other Names MUHAMMED

Registration Number MTECH/SSTE/2019/10616... Programme EDUCATIONAL TECHNOLOGY

Title of the Instrument MICROTEACHING ACHIEVEMENT TEST (MTAT).....

ATTESTATION SECTION

Summary of the Remark on the Instrument THE INSTRUMENT IS WITHIN THE LEVEL OF THE TARGETED STUDENTS

.....

I hereby attest that the above named student brought his instrument for validation

Name of Attester Dr. ADAMU ZUBAIRU SUTI

Designation SENIOR LECTURER

Name and Address of Institution FUT, MINNA

Phone Number 08036328687 ..... E.- Mail .....

Please comment on the following

1. Appropriateness of the instrument for the purpose it's design for..... APPROPRIATE .....
2. Clarity and simplicity for the level of the language used..... CLEARLY .....
3. Suability for the level of the targeted audience ..... SUITABLE .....
4. The extent in which the items cover the topic it meant to cover..... COVERED .....
5. The structuring of the Questionnaire..... STANDARD .....
6. Others (grammatical errors, spelling errors and others..... MINOR .....
7. General overview of the Instrument..... STANDARD .....

Suggestions for improving the quality of the Instrument

1. THE INSTRUMENT CAN BE REVIEWED .....
2. .....
3. .....
4. .....
5. .....

Name of Validator. DR. ABAMU ZUBAIRU ENUT

Area of Specialization. EDUCATIONAL TECHNOLOGY

Name of Institution. FUT, MINNA Designation. SL

Signature..... Date 09/08/2021

Thank You

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF EDUCATIONAL TECHNOLOGY

Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. She/he is conducting a research and you have been selected as one of those with requisite expertise to validate his/her instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality of his/her research instrument. We therefore crave for your assistance in validating the instrument. The completion of the form serves as evidence that the student actually validated the instrument

Thanks for your anticipated assistance.

GENERAL
Dept of Educational Technology
Fed. University of Technology
13 JUL 2021
P.M.B. 65 Minna
Sign

Dr. C.S. Tukura

.....

Head of Department (Signature, Date & Official Stamp)

Student's Surname. IBRAHIM ABBA ..... Other Names. MOHAMMED

Registration Number. MTECH/SSTE/2019/10616 Programme. EDUCATIONAL TECHNOLOGY

Title of the Instrument. TELEGRAM COLLABORATIVE LEARNING QUESTIONNAIRE (TCLQ)

ATTESTATION SECTION

Summary of the Remark on the Instrument..... The instrument is ..... Valid and reliable and can be used to obtain the relevant data (information).....

I hereby attest that the above named student brought his instrument for validation

Name of Attester... Dr. Yahsat L. Bulus .....

Designation..... Ass. Professor of Educational Psychology .....

Name and Address of Institution... Dept. of Educational foundations, Faculty of Education, University of Abuja

Phone Number. 08115857304 ..... E.- Mail. blyahsat@gmail.com

Please comment on the following

1. Appropriateness of the instrument for the purpose it's design for..... Very appropriate
2. Clarity and simplicity for the level of the language used..... Very relevant
3. Suability for the level of the targeted audience ... Very useful
4. The extent in which the items cover the topic it meant to cover..... Very valid and well covered
5. The structuring of the Questionnaire..... Adequate
6. Others (grammatical errors, spelling errors and others..... Very alright
7. General overview of the Instrument..... It's adequate for the purpose it is meant for.

Suggestions for improving the quality of the Instrument

1. .....
2. .....
3. .....
4. .....
5. .....

Name of Validator.... Dr. Yaksat, L. Bulus

Area of Specialization.. Educational Psychology

Name of Institution.. University of Abuja Designation. Ass. Professor of Educational Foundations

Signature..... Date. 5/9/2021

Thank You

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF EDUCATIONAL TECHNOLOGY

Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. She/he is conducting a research and you have been selected as one of those with requisite expertise to validate his/her instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality of his/her research instrument. We therefore crave for your assistance in validating the instrument. The completion of the form serves as evidence that the student actually validated the instrument

Thanks for your anticipated assistance.

GENERAL
Dept of Educational Technology
Fed. University of Technology
13 JUL 2021
P.M.B. 65 Minna
Sign

Dr. C.S. Tukura

.....

Head of Department (Signature, Date & Official Stamp)

Student's Surname IBRAHIM ABBA ..... Other Names MOHAMMED

Registration Number MTECH/SSTE/2019/10616 Programme EDUCATIONAL TECHNOLOGY

Title of the Instrument WHATSAPP COLLABORATIVE LEARNING QUESTIONNAIRE (WCLQ)

ATTESTATION SECTION

Summary of the Remark on the Instrument... It's adequate and relevant to collect data for the study.

.....

I hereby attest that the above named student brought his instrument for validation

Name of Attester Dr. Yakubu L. Bulus

Designation Ass. Professor of Educational Psychology

Name and Address of Institution University of Abuja. PMB 117, Abuja, Nigeria.

Phone Number 08118857301 E.- Mail bljakubu@gmail.com

Please comment on the following

1. Appropriateness of the instrument for the purpose it's design for.....
   .....Very appropriate.....
2. Clarity and simplicity for the level of the language used.....Very clear.....
   and simplified.....
3. Suability for the level of the targeted audience .....
   .....Very suitable.....
4. The extent in which the items cover the topic it meant to cover.....
   .....Well covered and relevant.....
5. The structuring of the Questionnaire.....Well structured and.....
   Standard.....
6. Others (grammatical errors, spelling errors and others.....Very insignificant.....
   and well laid out.....
7. General overview of the Instrument.....It's Very ready for.....
   use.....

Suggestions for improving the quality of the Instrument

1. .....
2. .....
3. .....
4. .....
5. .....

Name of Validator..Dr. Yakset L. Bulus.....

Area of Specialization.....Educational Psychology.....

Name of Institution..University of Abuja.....Designation..Ass. Professor of Educational Psychology

Signature.....Date 5/9/2021.....

Thank You

APPENDIX G

Pilot Test

Reliability of Micro-teaching Achievement Test (MTAT)

Correlations

T1 T2

T1	Pearson Correlation	1	.917**
	Sig. (2-tailed)		.000
	N	10	10
T2	Pearson Correlation	.917**	1
	Sig. (2-tailed)	.000	
	N	10	10

****.** Correlation is significant at the 0.01 level (2-tailed).

Reliability Collaborative Learning Questionnaire (CLQ)

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.844	.854	20

APPENDIX H

Introduction Letter

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF EDUCATIONAL TECHNOLOGY

PREOF. ABDULLAHI BALA, PhD Fssn
VICE CHANCELLOR
Dr. Tukura C. S.
NCE, Bed, MTech, PhD (Edu. Tech) UNN
HEAD OF DEPARTMENT
OUR Ref:

P. M. B 65, Minna
Telephone: 222304, 222397/28
Telegram: FUTECH. Minna
Telex

Your Ref: .....

Date 14/8/2021

.....

.....

.....

TO WHOM IT MAY CONCERN

The bearer IBRAHIM ABBA MOHAMMED with REG. NO. MTECH/SSTE/2019/10616 is a postgraduate student of Educational Technology Department. He/She needs your assistance to enable him/her carry out his/her research work.

We will appreciate your anticipated co- operation

Thank You

GENERAL
Dept of Educational Technology
Fed. University of Technology
13 JUL 2021
P.M.B. 65 Minna, Niger State

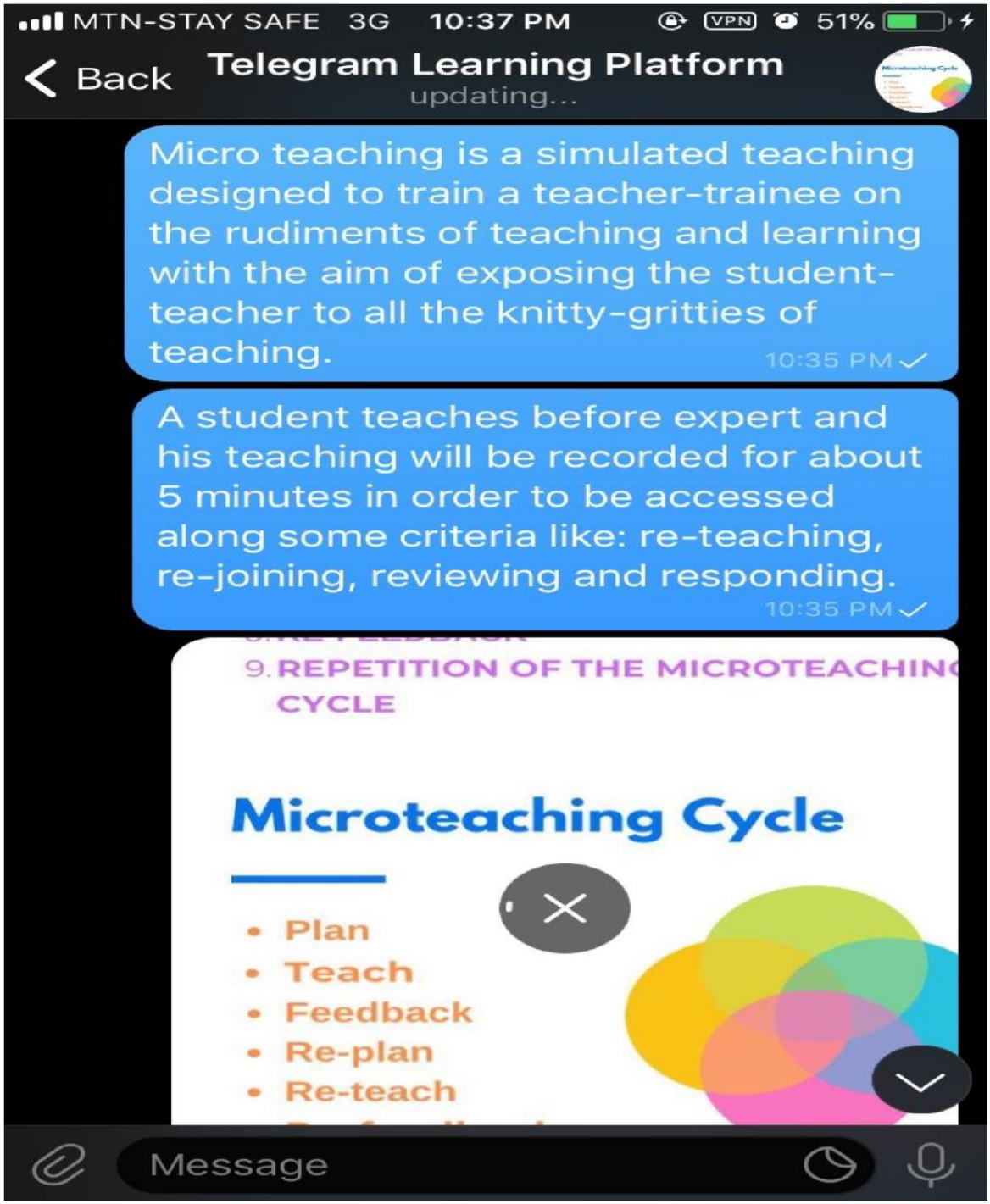
13/07/2021

Dr. Tukura C. S.
HOD, Educational Technology

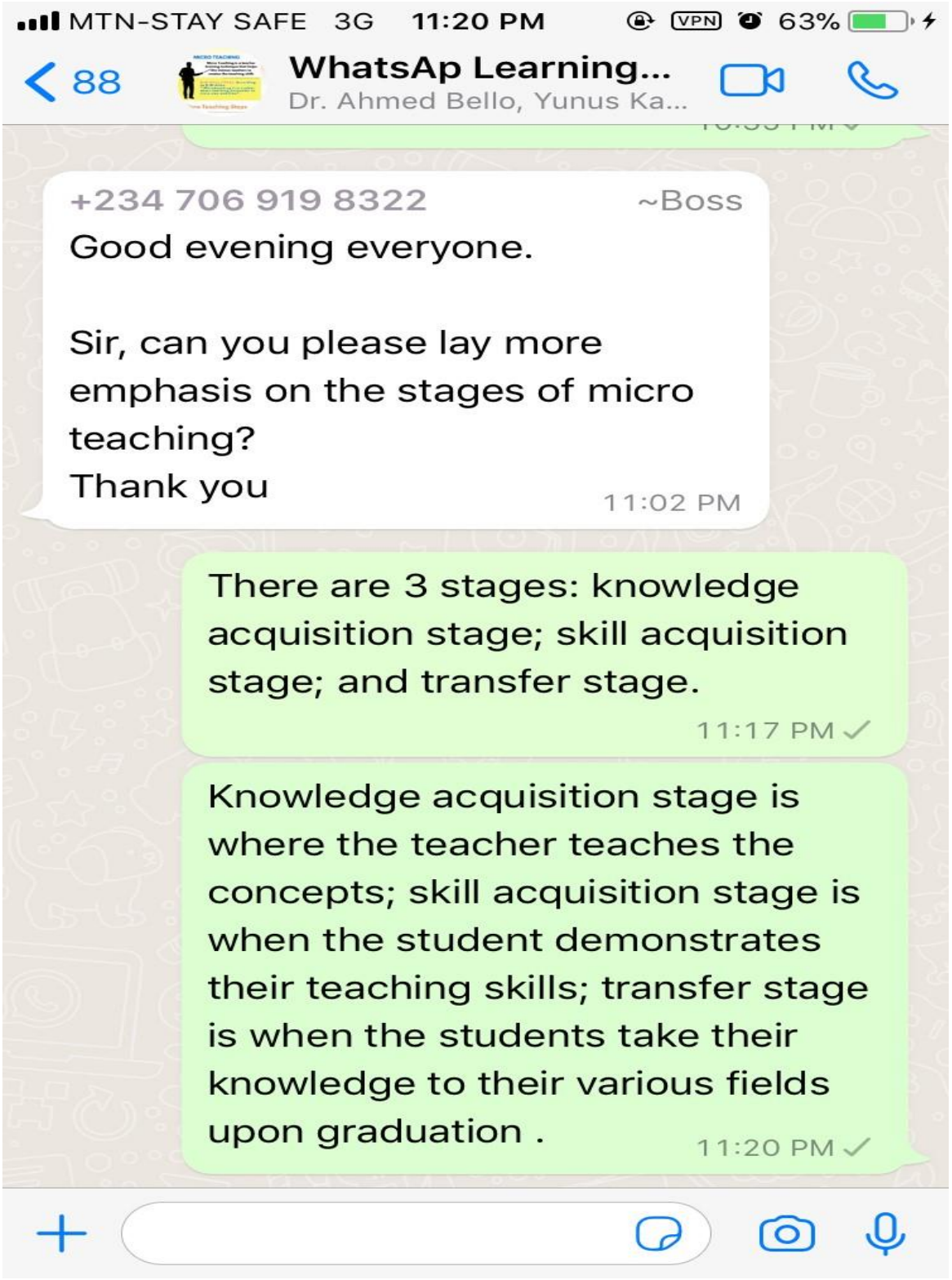
APPENDIX I

Field Photos

Students' Engagement on Telegram Platform



Students' Engagement on Whatsapp Platform during the Experiment



The Researcher at Faculty of Education in Gombe State University


welcome to
ACULTY OF EDUCATION
CUT-CEE; NUESA 2017/2018 EXCO
GME-686UY

Researcher at Faculty of Education, Federal University Kashere, Gombe State During the Administration of Instruments