

**ASSESSMENT OF LEVEL OF PREPAREDNESS, AWARENESS AND UTILIZATION
OF SKYPE TOWARDS TEACHING OF CHEMISTRY AMONG SCIENCE
EDUCATION STUDENTS OF FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA,
NIGER STATE**

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

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF SCIENCE EDUCATION,
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ABSTRACT

The study investigates the level of preparedness, awareness and utilization of skype among Chemistry Education Students in Federal University of Technology, Minna. The research work has three research questions and three research hypothesis were formed and tested at 0.05 level of significance. The respondents were selected from Science Education Department of Federal University of Technology, Minna, they were tested based on the questionnaires. The draft copies of research instrument was validated by Educational technology experts. The reliability coefficient was obtained using Spearman Rank Product Moment Coefficient (PPMC). The data was analyzed using Statistical Package for Social Sciences (SPSS version 23). Findings revealed that there was no significant difference in the level of preparedness of Students of Chemistry Education, Minna on the use of Skype in teaching and learning. There is deference in the level of awareness while the study also revealed that the utilization of Skype technology is not being maximized in the learning process in Federal University of Technology, Minna. Based on the findings, it was recommended among others that teachers should try as much as possible to always maximize the use computer for teaching in Federal University of Technology, Minna.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The emergency of technology has made the world into a global village and has transformed teaching and learning process. Technology integration into classroom instruction has gained much ground in both developed and developing countries. The concept of technology integration is now viewed as fundamental part of successful teaching and has gained the interest of many researchers who investigated and explored effective ways of integrating technology into the school curriculum (Hair J.F., *et al.*, 2010). Alkehlafi and Almeqdadi (2010) identified one overarching goal of technology integration: a school's ability to have a global learning environment with effective and appropriate use of technology in the classroom. However, the high cost of acquiring technology is still a major challenge in many developing countries, and its adoption is not expanding as quickly as expected. Many schools still have constraints on the effective use of technology in the classroom (Lim, Zhao, Tondeur, Chai & Tsai, 2013).

While discussing technology and teaching, teachers face a host of challenges as they are given the responsibility of deciding how they will deliver assigned curriculum. Much like a complex equation, teachers must factor in numerous variables that will change every semester or year depending on student loads, student needs, grade levels, maturity, development resources, as well as environmental factors outside the school. These intricate variables play a crucial role in developing a solution to this complex equation. Once the educator has determined those unknown variables, a decision can be made as to which pedagogical and technological methods to apply. A central theme herein is the "Social Constructivist Learning Theory." The "Social

Constructive Learning Theory” implies that students learn better through active interactions with their peers rather than listening to lectures.

Social constructivist’s reason that peer interactions, students are able to process new information in a way that’s understandable to them, therefore leading to higher order thinking. Science-based guided inquiry (POGIL), and project-based learning (PjBL) (Tseng K., *et al.*, 2011). Educational technology is one of the greatest resources we have to help our students learn. While chemistry is a part of our everyday lives, students have found that Chemistry can be difficult to understand (Tarhan L., *et al.*, 2014). If a student is found to be weak in one area, additional support should be given to help that student strengthen their weak area so that they too can have an opportunity to realize their full potential. For teachers, finding time to provide additional support to help students overcome weak areas can be very difficult.

There is a big task to prepare and be aware of modern technology both by teachers and learners. Using technology as a way for students to build skills in weak subject areas will make difficult times of learning fun and enjoyable, but most importantly it will help students build the confidence they need to succeed. Technology is not only beneficial to struggling students; rather, it is beneficial to all students. By using technology, teachers can bring chemistry to life and students will be able to visualize abstract concepts and test new learned concepts in chemistry. For 21st century learners, incorporating technology into the classroom is critical. Exposing students to technology while teaching chemistry will increase their knowledge and help them build skills that will make them competitive in the STEM workforce (Strengthen Science Education and the Scientific Workforce – American Chemical society).

Skype is a proprietary telecommunications application that specializes in providing video chat and voice calls between computers, tablets, mobile devices, the Xbox One console, and smartwatches over the Internet. Skype also provides instant messaging services. Users may

transmit text, video, audio and images. Skype allows video conference calls. At the end of 2010, there were over 660 million worldwide users, with over 300 million estimated active each month as of August 2015. At one point in February 2012, there were 34 million users concurrently online on Skype (*Skype Blogs*). Skype allows users to communicate over the Internet by voice, using a microphone, by video using a webcam, and by instant messaging. Skype implements a freemium business model with Skype-to-Skype calls being free of charge, while calls to landline telephones and mobile phones (over traditional telephone networks) are charged via a debit-based user account system called Skype Credit. Some network administrators have banned Skype on corporate, government, home and education networks, citing such reasons as inappropriate usage of resources, excessive bandwidth usage and security concerns (TMCnet, 2010).

Utilization being the action of using something that is making practical and effective use of it, which simply refers to the use of something or the process of using it effectively. Skype technology in this case is being implemented in teaching in learning environments. Chemistry Lecturers in implementing their teaching of chemistry in higher Institutions digitally with the use of Skype. The emphasis is on interactive teaching of Chemistry, using skype. Therefore, our goal is to create and verify an interactive Chemistry course for secondary schools based on the characteristics of interactive, ICT-connected education and more interesting presentation of the subject matter.

Central to e-learning success is communication technology that are generally categorized as synchronous. Synchronous technologies allow activities to happen at the same time and involve the exchange of ideas and information with one or more participants. Students can interact in real time with their own computer using text chat, live voice, and interactive whiteboards. Such technologies include Skype – which is used for web conference

technology in two ways; small group communications and online office hours to communicate with individual students.

Restructuring of chemistry lessons to accommodate new course standards and meet student learning needs has chemistry teachers looking outcomes gained from using online technology that correlates to standardized student achievement test (NC ES, 2012).

Currently teachers' academic effectiveness and student's academic success is measured by student achievement scores on standardized achievement test. In this literature review, emphasis was placed on reviewing research studies that used data from student achievement scores as a determination for effectiveness of online technology to effectively teach chemistry in secondary schools (Gambari, *et al.*, 2016).

The greatest evidence for supporting the effectiveness of online technology to effectively teach chemistry in secondary schools came from results of the 2000 National Assessment of Education Progress (NAEP), Science Assessment (NC ES, 2012).

1.2 Statement of Problem

Nigeria, being a developing country, faces the challenges of access technology rich education. The Federal Ministry of Education (FME), Universal Service Provision Fund (USPF) and several private organizations have assisted many schools by providing various technology solutions, such as supplying personal computers, setting up computer laboratories and other facilities inclusive of Internet connection, as well as interactive whiteboards (IWBs) and projectors (USPF, 2010). Although students and institutions can clearly benefit from increasing online offerings, there are still many issues, such as preparation to teach online courses, the cost of setting-up the online classes and meeting up the computer literacy level of teachers and learners.

1.3 Purpose of the Study

The demand for online education opportunities means that school managements must step-up technologically to meet the need. The purpose of this study was:

1. To investigate the level of preparedness and awareness for the use of Skype towards preparing the students of Science Education Department, Federal University of Technology, Minna to use the technology in teaching.
2. To also examine the extent to which Skype technology is being utilized in teaching by students of Science Education Department, Federal University of Technology.

1.4 Research Questions

The following research questions provide the framework for this study:

1. What is the level of preparedness of science education students towards the use of skype in teaching chemistry.
2. What is the awareness level of Students of Science Education Department, Federal University of Technology, Minna Towards the use of skype technology in teaching?
3. What is the level of utilization of skype in teaching science and science education students.

1.5 Research Hypothesis

The following research questions provide the framework for this study:

1. There is no significant difference in the level of preparedness of science education students towards the use of skype in teaching chemistry.
2. There is no significant difference in the awareness level of Students of Science Education Department, Federal University of Technology, Minna Towards the use of skype technology in teaching?
3. There is no significant difference in the level of utilization of skype in teaching science and science education students.

1.6 Significant of the Study

The study is significant in the following areas: students will benefit from this study by utilizing the modern technology of Skype in learning to excel; also the Chemistry Education students (i.e.

would-be lecturers) will be familiarized with the online technology to impact uninterrupted knowledge on their students after graduation when they fully start their teaching careers which in turn will improve students' academic performance.

1.7 Scope of the Study

The study was carried out at Federal University of Technology in Minna, Niger State. The study is delimited to Students of Chemistry Education Department of the Institutions. The content area covers are: the human resources to meeting the modern technology, learning environment and the study also investigate the available facilities in teaching with the use of skype technology.

1.8 Operational Definition of Terms

Preparedness: This refers to a very concrete research-based set of actions that are taken as precautionary measures in the face of potential disasters. It is the ability of governments, professional response organizations, communities and individuals to anticipate and respond effectively to the impact of likely, imminent or current hazards, events or conditions. It means putting in place mechanisms which will allow national authorities and relief organizations to be aware of risks and deploy staff and resources quickly once a crisis strikes.

Modern technology: It is the advancement of old technology with new additions and modifications. It is all about efficiency and speed; it is about ensuring face-to-face communication, connecting you and empowering you by giving you more access and control to the kind of care you get as well as service you receive.

Utilization: The action of making practical and effective use of something. It is the '*steps to increase the utilization of resources*'

Awareness: It is the state of being conscious of something. More specifically, it is the ability to directly know and perceive, to feel, or to be cognizant of events

Resources: A resource is a source or supply from which a benefit is produced and that has some utility.

CHAPTER TWO

2.0 REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter contains the relevant literature reviewed and discussed under the following frameworks:

- i. Conceptual Framework;
- ii. Theoretical Framework;
- iii. Empirical Studies and;
- iv. Summary.

2.2 Conceptual Framework

2.2.1 Concepts of Science and Technology

Science and technology is a gateway to a scientific and technological greatness of African nations and Nigeria in particular. (Okah-Avae, 2013) observe that no nation has been known to have developed, having an identity and status without one form of technology or the other. Science and technology differentiate between the rich and the poor nations, and has categorised the world into the first, second, and third worlds. (Nsofor, 2012; Onasanya & Owosenwa, 2011) observe that science is the foundation upon which the bulk of present day technological breakthrough is built, the researchers added that nations all over the world including Nigeria are striving hard to develop technologically and scientifically, since functioning of life depends on science. Sheldon (2014) defined science as an intellectual activity carried on by humans designed to discover information about the natural world in which humans live and to discover the ways in which this information can be organised into meaningful patterns. Science is a vital agent of social and political change in the economic and technological development of a nation.

(Ema & Ajayi, 2016) opined that technology is often used as the generic term to encounter instruments, machines and devices people develop and use in their lives. This implies that, technology touches our lives in so many ways. (The United Nations Scientific and Cultural Organization (UNESCO), 2015 in Ema & Ajayi, 2016) define technology as "The knowhow and creative processes that may assist people to utilize tools resource and systems to solve problems to improve the human condition".

2.2.2 Nigeria and Technology in Education

Many nations across the world have enacted national information and communication technology policies, which serve as a framework for integration of ICT into all facets of society. Nigeria, among other African countries, is not an exception. At the 32nd ministerial council meeting of the National Council on Education in 1987, the federal government decided to introduce computer education into the nation's secondary school system. This led to the formulation of Nigeria National Computer Policy in 1988 with the objectives to bring about a computer literate society in Nigeria by the mid-1990s and enable present school children to appreciate and use the computer in various aspects of life and in future employment (Jegede & Owolabi, 2013). This policy did not penetrate the education system as expected, and a new national policy on ICT in education has been developed by the FME (2012). While the lack of an adequate policy did not stop the government or other stakeholders from deploying various technology solutions to schools, the ICT penetration is still low.

One of the government agencies, the Education Trust Fund (ETF), funded the ETF DigiNet project. The project was designed to address the severe digital infrastructure problem in Nigerian schools. Over the years, the project provided schools, irrespective of their locale, with 21 desktop systems, a server. VSAT-based Internet, and an alternate

power supply in terms of solar or generator. The project transcended the provision of equipment, by providing adequate teacher training, technical support and a professional learning community (SchoolNet. 2013). Similarly, a private organization, MTN as part of their corporate social initiatives, tagged their technology intervention "MTN Schoolsconnect," and it was deployed to many schools across the country (SchoolNet. 2015).

As the one-to-one initiatives became popular across the world, another government agency. USPF deployed 100 Intel Classmate PCs per school, to facilitate technology usage in several schools. From 2007 to 2010, USPF provided this technology intervention in over 1,000 government schools. To reach out to the underserved community, the National Information Technology Development Agency (NITDA) deployed technology interventions to help rural communities. The rural information technology centers serve established communities, while the mobile Internet units serve rural schools (NITDA, 2010). This was further enhanced by i-connect mobile unit project, which also served schools that do not have access to technology (Begho, 2012).

Despite such interventions, the percentage of both private and public schools that have benefitted was still very low compared with the number of schools in the country. One major challenge was the lack of adequate evaluation of the various interventions in order to determine the best fit amidst other challenges such as poor funding, sustainability, inadequate infrastructures, and constant power outages.

Technology interventions in many schools across the world have attracted huge financial investments. In addition to government funding, several nongovernmental organizations have now also intervened through corporate social initiatives. Despite the effective technology integration, there have been challenges in deploying holistic solutions. Periodic evaluation of the

technology interventions was a large task, especially in rural communities. Studies focusing on technology interventions that worked best in many rural communities are still limited.

2.2.3 Concept of Social Media

The term "Social" is used to distinguish it from other types of networks such as computer and phone networks. This type of relationship could include purely social, the flow of information or goods between people, business connections and mentoring to name just a few. "Networking" is the act of reaching out. Buzzetto-More (2012) stated that social networking services are computer applications that support the complex arrangement of connected nodes (people) with tools for storing and presenting information as well as communicating, connecting, and interacting with others. Walter and Riviera (2014) stated that social networking is "the relationships that exist between network of people" A social network is the web of relationships that connect people together, most people will find themselves involved in these overlapping networks at some time or another participating in this network for various reasons. Social networking has become one of the most important communication tools among people nowadays, however social networking exist on the internet websites where millions of people share interest on certain disciplines and make available to members of these network share various files, photos and videos, create blogs. send messages and conduct real time conversation. Boyd and Ellison (2013) opined that social networking sites are web-based services that allows individuals to either construct a public or a semi-public profile within a bounded system or articulate a list of other users with whom they share a connection, view and transverse their list of connection and those made by others writing system.

Social networking is a platform to build social networks or social relations among people who for example share common interest, belief, activities, backgrounds or real life connections. Social networking is an online platform where people can develop social works, have same interest and are able to share ideas and opinions to a vast network with the help of such sites. Social networking is the collective of online communications channels dedicated to community-based input, interaction, content sharing and collaboration. (Anderson, 2013) defines the term "social networking as the network tools that allow people to meet, interact and share ideas with each other' Social networking has become one of the most important tools among people lately.

Skype is a software program using voice over IP, or VoIP, technology. IP stands for "internet protocol." Cross platform, multi-lingual, and free to both download and use, Skype software permits users to make high-quality audio and video "phone calls" over the Internet, send instant messages, and do video conferencing online. It is one of the best voices-over internet services online and was created in 2003 by Niklas and Janus but later on was owned by Microsoft particularly in the year 2011. Skype has over 663 million registered users as of September 2011, putting it at the top ranks with Face-book and Twitter. Teachers may download and use Skype at school. The slogan of Skype is "the whole world can talk for free".

2.2.4 Technology Integration

Attaining a high level of achievement has been attributed to many factors inclusive of a technology-enabled learning environment. The rapid evolution of varied technology tools has created a need for users to keep abreast of the emerging technologies. However, the success of the technology-based environment has many challenges, both at the teacher and school level. This section will review literature on the impact of technology on students' achievement and the effectiveness of technology usage in the classroom to enhance teaching and learning process.

2.3 Effective use of technology in the classroom

Research (Cakir et al., 2014; Inan & Lowther, 2010; Thieman, 2008) has supported teaching and learning with technology across the curriculum in order to transform the learning environments. But integrating technology into classroom instruction goes beyond teaching basic computer skills; it must happen across the curriculum and include the major components of learning such as active engagement of students, teamwork, collaboration, evaluation of impact, and connection to real-life situations. The use of technology tool is not a one-time event but must be consistent, transparent, and support curricular goals.

Researchers have developed frameworks for technology integration in their studies (Groff & Mouza, 2018). In their study on investigating student attitudes toward a synchronous online graduate course in a multiuser virtual environment (MUVE), Annetta et al. (2015) shared their findings on the effective use of technology. The MUVE environment was designed to evoke in the user a sense of virtual "presence," that is, a sensation the participant has of being in another place while visiting a virtual

environment. Surveys and observations carried out with a sample class centered on student products, instructor-student interaction, plans to implement course features, and perceived difficulties in implementation. The students benefitted from using the MUVE by moving from a state of virtually no knowledge to one in which they acquired skills in virtual environments and were able to create a functional and engaging learning activity. In addition, the students gained a wide range of comfort and proficiency with the use of technology.

Creating an effective learning environment with technology is still a challenge, and there is a struggle to find consistent success with technology-based instruction. Groff and Mouza (2018) indicated that amongst the barriers of effective use of technology is the lack of access to technological resources. The teachers' lack of technology-based skills, along with their attitudes and beliefs, was not favorable to a technology-based learning environment. Groff and Mouza (2018) developed a coherent framework titled "Individualized Inventory for Integrating Instructional Innovations" (i5), which can provide practical assistance to teachers as they navigate the process of technology integration. They found that i5 helped teachers identify and address potential challenges associated with the implementation of technology-based projects in the classroom, thereby increasing the likelihood of achieving success in technology integration. Although most researchers believed that technology can change the teaching process, making it more flexible, engaging, and challenging for students, little actual evidence exists to support these claims.

In past years teacher education programs have been criticized for not training preservice teachers how to integrate technology into their classroom instruction. Thieman (2013)

analyzed how K-12 preservice teachers used technology as a tool for student learning, given technology standards for teachers and students from the International Society for Technology in Education (ISTE, 2017) and considered how those experiences relate to 21st-century citizenship skills. The key findings indicated that 85% of preservice teachers integrated technology skills and knowledge in instructional practice with their K-12 students. About half of the sample works suggested that students benefit with the use of technology in the classroom especially in the areas of creativity, innovation, communication, collaboration, research, and information fluency. Thieman (2013) believed there was little evidence that K-12 students used technology to support critical thinking, problem solving, and decision making. However, the author suggested a followup study to evaluate the extent to which teachers and their students are meeting current expectations for digital citizenship skills through the use of various technology tools.

Other studies (Inan & Lowther, 2010; Levin & Wadmany, 2013) explored factors affecting the use of technology. In their 2010 study on factors affecting technology integration in K-12 classrooms, Inan and Lowther (2010) established that barriers such as teachers' demographic characteristics hindered the successful use of technology. However, teachers' computer proficiency, beliefs, and readiness positively influenced the use of technology in the classroom. Other factors such as the school factors also positively influenced teachers' belief and readiness. In essence, teachers' beliefs and readiness may mediate the indirect effects of school and teacher level factors on the use of technology by the teacher in the classroom.

Levin and Wadmany (2013) explored teacher views on factors affecting their use of information and communication technologies (ICT) in the classroom and how those views reflect changes in teachers' beliefs and actual classroom practice. The findings revealed the positive influence on teachers' use of technology. Levin and Wadmany (2012) believed it was important to understand teachers' view, experience and educational practices when technology was introduced into their classroom. Teachers' practices and belief may determine to which extent technology will be integrated into their classroom practice.

Palak and Walls (2015) studied teachers' beliefs and technology practice rationale because of the ongoing contradictions in findings between teachers' beliefs and technology usage. The fundamental goal was to determine if teachers who often integrate technologies, and work at technology-rich schools, change their beliefs and consequently their instructional practices toward a student-centered paradigm. The methodology involved mixed-methods design using multiple variables and sampling techniques in selecting technology. Teachers from 28 Benedum collaborative professional development schools participated. The findings in the quantitative analysis revealed no shift in teacher practice. In the qualitative phase the results of both methods were integrated. The results showed that teachers' positive attitudes toward technology did not necessarily have the same influence on student instructional strategies. Palak and Walls (2013) stated that the focus of technology integration should be on student-centered pedagogy and future professional development may need to model a theory of change toward a student centered paradigm. The findings further corroborated results from prior

research that indicate teacher technology use in a technology-rich environment did not transform teaching into more student- centered practice (Judson, 2016).

2.4 Skype for education

Internet connectivity in educational settings provides opportunities for interactive exchange and collaboration between students living on other sides of town or the other side of the planet. These synchronous, real-time discussions using free software like "Skype" can tangibly expand the walls of the traditional classroom and engage students to write, share, and communicate with an authentic audience. Educators interested in helping motivate students to develop both traditional as well as twenty-first century literacy skills in the classroom can and should use audio and video conferencing technologies like Skype to literally plug their students into collaborative exchanges with global partner.

Skype for education opens the door to many possibilities. Depending on the type of school, educators can use Skype for everything to improve the quality of education. Chalkboards, textbooks and visual aids have been used to teach, but advancement of the technology has begun altering the way of students in learning. Skype, an application you can download for free on your computer or mobile phone, allows you to make voice and video calls over the Internet. It can also be used in the classroom to expand the educational landscape. From guest lecture, field trips, parental conferenc and tutoring, Skype has the ability to enrich the learning process for both students and teachers.

2.5 Importance of Skype in Education

Skype as an easy and inexpensive way of communication between people all over the world, open the door to a wide range of activities that can improve student engagement and comprehension.

Interacting with people from different cultural and ethnic backgrounds help students understand cultural differences and learn about history and social norms. Skype is the most important to the students in learning a new language. It can connect them to native speakers everywhere in the world and let them fine-tune their foreign language skills.

Learning becomes more authentic, inspirational, and engaging when it transcends the walls of the classroom.

Skype offers an easy way for students and instructors to engage in synchronous communication.

2.6 Uses of Skype in Teaching and Learning

Teachers can use video conferencing to hold teaching sessions with their students while being away from the classroom.

Teachers can have guest speakers talk directly with students using video conferencing, these speakers can be for instance, authors, producers, or other teachers or even students.

Skype can be used in a language classroom to help students improve their linguistic skills via speaking to native speakers of the target language.

Use Skype as a tool to provide after school help to students needing extra attention.

Skype can be used to help students with disabilities, special needs or who are absent to catch up with the class from home.

- Teachers can connect their classes via Skype with other classes on the other side of the world.
- Students can use Skype to do peer teaching and also to forge lasting and solid friendships with each other arc it locally or internationally.
- Students can use it to collaborate on classroom projects and assignments by making free video calls and even video conferencing.
- If you take your class on a field trip, then Skype will make you able to connect with parents or other classes to share your experience with them.
- Teachers can use Skype for professional development mainly by connecting to other educators and watching and sharing conference presentations.
- Teachers can use Skype to share student's classroom work with their parents.
- In ease of issues with a student, teachers can use Skype to hold a video conference session with a parent who, because of circumstance, could not attend physically to the school.
- Teachers can use Skype to collaborate with each other. They can, for instance, do peer tutoring by having an experienced teacher or mentor teacher watch one teaching via Skype and then give valuable feedback to him/her.

2.7 Skype in the classroom

Skype in the classroom strives to enrich students' learning experiences to discover new cultures, languages and ideas without leaving the classroom. It is excited to collaborate with teaching, like-minded organizations to bring relevant content directly to innovative teachers who are looking to create unforgettable shared learning experiences for their

students. Skype announces collaboration with prominent educational organizations to further empower teachers with educational resources through technology by offering Skype in the classroom. This collaboration marks Skype's latest initiative to reach its goal of connecting one million classrooms globally through Skype in the classroom, a free online community that helps teachers use Skype to enrich experiences for students.

Using Skype in the classroom is a highly effective way to open your students' eyes to a whole world far beyond the school grounds. The use of Skype enables teachers to invite a range of different people to speak to their class from anywhere in the world. It enables teachers and students to connect from around the globe sharing their knowledge and experiences, bringing diversity to the class which would not be possible otherwise.

2.8 Theoretical Framework

This section offers some suggestions of theories that support the use of Skype in teaching and learning process. These include Blended theory, Mayer's cognitive theory and the collaborative learning strategies. With the trend of Skype, there has been an increased focus on the level of awareness and utilization in teaching and learning for proper effectiveness and efficiency of instructional design strategies in education and training. Most of the important advances come from the field of cognitive science, which deals with the mental processes of memory' and learning.

2.8.1 Blended Learning Strategy

Pegler (20013) observed that blended learning is an approach to learning and teaching which combines and aligns learning undertaken face-to-face sessions with learning opportunities created online. Devancy (2014) stated that blended learning supports

competency based learning in at least four ways; "Online content can offer a continuum of learning along which students can progress at a flexible pace". Assessment can be delivered on demand when students are learning online.

Students have more than one lesson or one information source, through which to access content because online learning is delivered in a "more modular manner" than face-to-face instruction, this leads to students having "multiple pathways to mastery".

Blended learning offers tools for personalized education which can support districts that are trying to scale competency based learning system. Mcsporran and King (20015) opined that blended learning can be described as a mix of deliver)' methods that have been selected and fashioned to accommodate the various learning needs of a diverse audience in a variety of subjects. Bonks & Graham (2013) also observed that blended learning combines classroom based learning with computer mediated instruction but it also describes learning that mixes various event-based activities, including face-to-face classrooms, live e-learning and self-paced learning (Valiathan, 2012).

2.8.2 Mayer's Cognitive Load Theory

Cognitive load theory is an instructional model fashioned from the field of cognitive science research. Cohen & Hill (2010) described learning in terms of an information processing system made up of long term memory, which stores knowledge and skills on a more or less permanent basis and working memory, which stores knowledge and skills on a more or less permanent basis and working memory, which performs the intellectual tasks associated with learning.

The fundamental principle of cognitive load theory is that the quality of instructional design will be greater if attention is paid to the role and limitation of working memory. Mayer & Moreno (2013) observed that the total amount of mental activity imposed on working in an instance of time is known as cognitive load, which has been found to have three distinct parts.

Intrinsic load includes the inherent complexity of the subject matter and reflects the level of difficulty of the material to be learned. For instance, the mental calculation of $3 + 5$ has lower intrinsic load than solving an advance algebraic equation, due to a higher number of elements that must be handled simultaneously in working memory.

Extraneous load is the load imposed by the elements of the instructional design itself. For example, audiovisual presentation will usually have lower extraneous load than a visual only format, since the audio modality is also being used to convey information to the learner. Skype employed in this research, based on the point raised in the meaning of extraneous load, it therefore means that the Skype which is a video and voice calls presentation will usually have lower extraneous load than voice calls only format, since the video modality is also being used to convey information to the learner.

2.8.3 Collaborative Learning Strategy

For a successful learning session to occur a relationship should exist where a social context of learning environment supports the content being taught. The study shows how social environment can influence students learning and thinking.

2.9 Review of Related Empirical Studies

Philomina and Amutha (2015) conducted a research study on Information and Communication Technology Awareness among Teachers educators. Information and Communication Technology (ICT) has influenced all aspects of life. Processing the knowledge of ICT is really the need of the hour. This paper describes the ICT awareness among teacher educators. The framework raises important questions of how- teachers use technological devices in their teaching learning process in order to understand the concept in a better way. It also emphasizes teachers to integrate technology into the instruction in the 21st century. The aim of the present study is to appraise the awareness among teacher educators in Tiruchirappalli district in India. The sample of the present study consists of 42 teacher educators. Descriptive analysis were used to analyze the data. The results indicate that Indian teacher educators awareness towards ICT differs regarding gender and subject. When compared with M.Ed, and M.Phil, scholars. Ph.D. scholars surpassed the M.Ed, and M.Phil, scholars in terms of ICT awareness in different dimensions. Indeed in India teacher educators' awareness on ICT integration needs to be strengthened.

Mikulec (2012) conducted a research on pre-service Secondary Teachers' Awareness of Issues of Self-disclosure on social networking sites. An important component of teacher education is the emphasis on what it means to be a professional in the field. Teacher educators must help pre-service teachers recognize that what may be acceptable in their lives now may not be when they are looking for their first job or once they are in the classroom. One such issue is the use of social networking websites, such as Facebook, and how the information that teachers post can affect them as professionals. This paper discusses the results of a study of 68 pre-service secondary teachers and their

understanding of the impact of self-disclosure on social networking as future educators. The results suggest that while pre-service teachers found many of the issues at hand to be common sense, they developed a deeper understanding of the ramifications of unprofessional self-disclosure on social networking sites after being presented with a number of case studies and examples.

Robert (2015) conducted a research study on the awareness of facebook education among student teachers in present Scenario. Facebook is one of the most popular social networks in the world. Day by day, it is becoming an indispensable part of people lives affecting the daily routine of people. Developments in Computer Technology lead to developments in Communication Technologies and styles as well. Facebook is one of the significant examples of these developments. In addition, mobile phone companies encourage people to use wireless devices in order to connect to Social Network. The aim of the present study is to investigate the awareness of Facebook Education among student teachers in current scenario. The objective of the study was to find the difference between/among student teachers in their awareness of facebook education with respect to gender, locality, religion and family income, and also to find the correlation between Facebook awareness and Academic achievement among student teachers in Kanyakumari district. The investigator has used two tools for the study. They are 'Facebook awareness scale' and 'Personal data sheet'. The hypothesis of this study was that there is no significant difference/among student teachers in their facebook awareness with respect to gender, locality, religion and family income. Also there is no significant correlation between facebook awareness and academic achievement among student teachers in Kanyakumari district. The finding shows that there is no significant

difference between/among student teachers in their facebook awareness with respect to gender, locality, religion and family income. But there was positively very high correlation between Facebook Awareness and Academic achievement. Therefore it was concluded, that facebook awareness in education is important to all the student teachers in different areas irrespective of the. gender, religion and income of the family.

Bexheti, Ismaili and Cico (2015) conducted a research on an analysis of social media usage in teaching and learning. Social media are becoming the most important tools for interaction among people, where everybody can share, exchange, comment, discuss and create information and knowledge in a collaborative way. The aim of this study is to analyze the use of social media in teaching and learning based on literature study and experiences in different faculties at South East European University. The study examined the impact of the social media applications on personal and teaching use. Based on a representative sample of teaching staff from all the faculties at SEE University, the study investigates their level of awareness and their experiences in the use of social media, as well as the opportunities and value they see for addition of social media applications as part of the teaching process. The starting point of the study is to examine impacts of personal use of social media on teaching. In this examination phase we evaluate teachers¹ level of awareness of the various social media applications. Is the teaching staff as well-informed about the existence of the various social media applications as the general population is or their students are? Like the general population, the teachers might use social media for different purposes. This study attempted to differentiate between two different kinds of use: for personal use only, with no connection to teaching responsibilities and for use in teaching and learning. Further aspects on what value, if

any, they distinguish in social media applications and how they use them in the teaching process are also explored.

Eaton (2010) conducted a research study on using Skype in the second and foreign language classroom. This presentation introduced Skype and how it can be used to: 1) connect teachers with other professionals - and save on long distance charges - even internationally 2) empower language teachers and tutors 3) give presentations and workshops 4) be a stepping stone to using more sophisticated technology in the classroom. It was noted that for those who are new to using technology in the language learning classroom. Skype is an effective way to experiment with technology, while-minimizing the risk of things going wrong. Using Skype can help teachers improve their technology literacy and increase their confidence using technology in the language learning classroom. It provides an excellent stepping stone for those who are not entirely "fluent" with more sophisticated technologies.

Unal (2013) conducted a research study on comparative study of social network usage and adoption among Turkish prospective teachers. Research on educational usage of social networks focused on university students because of their more intense usage of medium. In this context, it is necessary to determine social network usage objectives, adaptation levels and patterns of prospective teachers as future educators. The main purpose of this study is to analyze prospective teachers in terms of intended uses of social network sites and the level of adoption of social networks. Research was conducted with 453 prospective teachers' studying at the faculties of education in Marmara, a state university and Maltepe, a foundation university in Istanbul. In this

study universities were also compared by their types and differences were found. For data collection. Intended Use of Social Networking Sites Scale and The Social Network Adoption Scale were used. In addition, authors developed a Personal Information Form to determine prospective teachers' demographic characteristics and patterns of use of social networks. For this study, comparative and relational analysis techniques were used and statistical results have been obtained. The results showed that (a) Prospective teachers' duration of use of social networks varies according to the type of foundation or state university; (b) Prospective teachers studying in both types of university, do not prefer social networks for discovery and recognition of themselves and their peers; (c) Prospective teachers' rates of educational use of social networks is quite high; (d) Prospective teachers' adoption levels of social networks is high.

Beena and Mathur (2012) conducted a research study on the awareness of ICT on M.Ed Trainees. Information and communication technology have become common place entities in all aspects of life. Across the past twenty years the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavor within business and governance. Within education, ICT has begun to have a presence but the impact has not been as extensive as in other fields. Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. The use of ICT in education lends itself to more student centered learning settings and often this creates some tensions for some teachers and students. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century.

This paper highlights the various impacts of ICT on contemporary teacher training institutions of education and explores potential future developments. The paper argues the role of ICT in transforming teaching and learning and seeks to explore the awareness of teacher educators about use of information and communication technology for effective teaching learning process and how this will impact on the way programs will be offered and delivered in the teacher training institutions.

2.10 Summary

In this chapter, the reviewed literature provided the theoretical backing to the present study. Hence relevant literature reviewed centered on three frameworks i.e the conceptual framework, theoretical framework and the empirical framework. Having reviewed all this issues there is need to investigate the importance of Skype to would-be teachers in Federal University of Technology in Minna, therefore the present study is focusing on the level of preparedness, awareness and utilization of Skype.

CHAPTER THREE

4.0 RESEARCH METHODOLOGY

This section describes the method and procedures used in the study. The procedures are discussed under Research Design; Population and Sample; Research Instruments; Procedure for Data Collection and Method of Data Analysis

3.1 Research Design

Descriptive survey design was used for the study. This is because the research described the teachers' level of awareness, preparedness and utilization of skype in teaching process among Science Education Technology students of Federal University of Technology in Minna. Data was collected from Students of Chemistry Education Technology.

3.2 Population of the Study

The target population of the study comprised of 90 students of Chemistry Education, Science Education Technology Department, Federal University of Technology, Minna Niger State. The target population was the Science Education Technology Department's students of Federal University of Technology in Minna.

3.3 Sample and Sampling Techniques

Yaro Yamane sample techniques was used to determine the sample size of this study. The total population of the students were 90 and using Yaro Yamane sampling technique to calculate the sample size, 85 questionnaires were returned, which was now used for the research.

3.4 Research Instrument

The research instrument for this study was researcher's designed questionnaire. The instrument was designated as Teachers' Level of Awareness, Preparedness and Utilization of Skype (TLAPUS). The questionnaire has fifteen (15) items with three (3) Sections 'A', 'B' and 'C' with 5 items in each on a Linkert scale of three. It contains information on Awareness, Preparedness and Utilization of Skype in teaching among Students of Science Education Technology, Federal University of Technology in Minna.

3.5 Validation of the Research Instrument

Before administering the instrument, copies of the questionnaires on respondents, the draft copies of research instruments in the first instance was validate. Some copies of the questionnaire were given to two Education Technology experts from the Departments of Science Education, Federal University of Technology, Minna, one media expert from Department of Information and Communication Technology, Federal University of Technology, Minna and the researcher's Supervisor. And based on their comments, the questionnaire was modified by deleting some items and some were edited.

3.5.1 Reliability of the Research Instrument

After the validity, the modified questionnaire was pilot tested using some students that were not part of the sample size. The rationale behind the pilot testing was to enable the researcher to determine and diagnose problems encountered and forestall such problems during the real field work for the final administration of the instrument in the faculties to

be surveyed. Test split-half method was used and a reliability coefficient of 0.76 was obtained using Spearman Rank Product Moment Correlation Coefficient (PPMC)

3.6 Method of Data Collection

Permission to conduct the study in the selected study area which was Federal University of Technology, Minna was sought on the presentation of Letter of Introduction from the Head of Department. The reason behind presenting a letter of introduction lies in the fact that reasonable return of research instrument is expected to be obtained from respondents, that is, the teachers. The copies of questionnaire was administered by the researcher alongside with trained research assistant not only to ensure high response rate but also to establish rapport so as to explain some difficult aspects of the questionnaire to respondents if the need arises.

3.7 Method of Data Analysis

The statistical method used in the analysis of data was descriptive and inferential statistics. The descriptive statistics include: frequency counts, percentages and bar-chart. Inferential statistics was used to test the two –null hypotheses using Kruskal-Wallis Test. All statistical analysis of the data was conducted using the Statistical Packages for Social Science (SPSS Version 23). Significance level of 0.05 was used to test for all the null-hypotheses.

CHAPTER FOUR

4.0

RESULTS AND DISCUSSION

Introduction

This chapter deals with presentation of data collection, its analysis interpretation and discussion of findings. Kruskal-Wallis Test was used to test the hypothesis and therefore, the findings are discussed.

	Level of Preparedness for the use of Skype Technology	N	Mean Rank
Respondent	Highly Prepared	17	43.41
	Prepared	34	44.74
	Unprepared	34	41.06
	Total	85	

Test Statistics^{a,b}

	Respondent
Chi-Square	.383
df	2
Asymp. Sig.	.826

- a. Kruskal Wallis Test
b. Grouping Variable:
Conversant with Skype
Technology

Out of the 85 respondents, 34 respondents disagreed with level of preparedness for the use of Skype among Chemistry Education Students of Federal University of Technology, Minna, while 17 responded that they are highly prepared for the use of Skype.

From the analyzed result above, it can be seen that there was no significant difference in the level of preparedness for the use of skype towards teaching of Chemistry among Science Education Students of Federal University of Technology, Minna, Nigeria.

	Awareness for the use of Skype Technology	N	Mean Rank
Respondent	Highly Aware	24	54.88
	Aware	37	34.08
	Unaware	24	44.88
	Total	85	

Test Statistics^{a,b}

	Respondent
Chi-Square	10.526
df	2
Asymp. Sig.	.005

- a. Kruskal Wallis Test
- b. Grouping Variable:
Awareness for the use of
Skype Technology

The result showed that 24 respondents were highly aware of the use of Skype among Chemistry Education Students of Federal University of Technology, Minna, while 37 are aware whereas the remaining 24 respondents were un aware.

The assessment of Level of awareness of the skype towards teaching of Chemistry among Science Education Students of Federal University of Technology, Minna, Nigeria analyzed revealed a significant of 0.005. This showed that students the students were aware of the Skype technology towards teaching.

	Utilization of Skype technology in teaching	N	Mean Rank
Respondent	Highly Utilized	24	42.75
	Utilized	30	40.90
	Unutilized	31	45.23
	Total	85	

Test Statistics^{a,b}

	Respondent
Chi-Square	.472
df	2
Asymp. Sig.	.790

a. Kruskal Wallis Test

b. Utilization of Skype
technology in teaching

24 respondents showed that Skype is highly utilized in teaching while 31 respondents showed that skype has not been well utilized towards teaching of Chemistry among Science Education Students of Federal University of Technology, Minna, Nigeria was shown in the above table with the significant value of 0.790, which is greater than p-value of 0.05 The result showed that Skype technology is not being well utilized among Students of Chemistry Education, Federal University of Technology, Minna.

CHAPTER FIVE

3.0 SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter summarizes the whole research work, state the finding based on the data collected and analyzed. It also draws up summary and conclusion of the research finding and give useful and necessary recommendations and contribution to knowledge that will improve teachers' level of preparedness, awareness and utilization of Skype in teaching among Chemistry Education Students of Federal University of Technology, Minna.

5.2 Summary

The purpose of this research work was to find out the level of preparedness, awareness and utilization of Skype in teaching among Chemistry students of Federal University of Technology, Minna.

The research, in chapter one gave the introduction and background of the study, statement of the problem, state the research questions formulated the research hypothesis, the purpose of the study, the significant of the study, the scope and limitation, basic assumptions and the key operational terms that were also defined for easy understanding of the research work. In chapter two, related literature were reviewed about the chosen topic. This chapter gives the insight to the research chapter concerning the chosen topic and also gave the research a clue on how much work has been done in regards to this study and in what area should the research work concentrate on. The chapter three is concerned with the methodology of the research work. The deals with the research design, the population, sample and sampling technique, the instrumentation, the validity

and reliability of the instrument, the method of data collection in which a sample of ninety (90) questionnaires were distributed and 85 valid questionnaires were retrieved from Chemistry Education Students of Federal University of Technology, Minna. The data obtained were analyzed, the three hypothesis were tested at 0.05 significant level and the findings showed the preparedness, awareness and utilization levels of Skype as a tool for teaching. The result showed that the technology is not well utilized even same majority of the students are aware of the technology. Chapter five finally summarizes the whole research work, states the findings in a summary form, draws up conclusions and give useful and necessary recommendation. It also gives useful suggestion on the area or related area of the research work.

5.3 Implication of Major Findings of the study

The following are the implications of major findings of this study

1. The result showed the level of preparedness for the use of Skype in Federal University of Technology, Minna is low.
2. The Students of Federal University of Technology, Minna are aware of the use of Skype in teaching.
3. Skype has not been fully utilized in teaching.
4. The use of Skype has pushed the boundaries and allow you to learn with teachers from other countries.
5. The use of Skype has the ability to make teaching interesting.

5.4 Limitation of the study

The following are the limitations of the study:

Inadequate computer system in the schools might have negative impacts on the result of this study.

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