NEAR EAST UNIVERSITY

INSTITUTE OF GRADUATE STUDIES

DEPARTMENT OF HUMAN RESOURCES DEVELOPMENT IN EDUCATION

THE ROLE OF TECHNOLOGY ON THE PRODUCTIVITY OF TEACHERS AS PART OF HUMAN RESOURCE DEVELOPMENT IN EDUCATION

MASTER'S THESIS

Adaugo Isidore Philiper

Nicosia

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APPROVAL

We certify that we have read the thesis submitted by Isidore Adaugo Philippe titled **"The Role of Technology on the Productivity of Teachers as part of Human Resources Development in Education"** and that in our combined opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Educational Sciences.

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DECLARATION

I hereby declare that all information, documents, analysis and results in this thesis have been collected and presented according to the academic rules and ethical guidelines of Institute of Graduate Studies, Near East University. I also declare that as required by these rules and conduct, I have fully cited and referenced information and data that are not original to this study.

Isidore Adaugo Philiper

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LOVE YOU ALL

Adaugo Isidore Philiper

ABSTRACT

THE ROLE OF TECHNOLOGY ON THE PRODUCTIVITY OF TEACHERS AS PART OF HUMAN RESOURCES DEVELOPMENT IN EDUCATION

Adaugo Isidore Philiper

Human Resources Development in Education

Thesis Supervisor: Assoc. Prof. Dr. Fatma KÖPRÜLÜ

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Technology is all over education. The benefit of computers, the usage of the internet, free online platforms, digital learning contents, online teaching resources, and physical technology teaching resources used by rural, remote and physical schools are all the roles of technology.

The development of technology as part of human resources in education, is a factor to increase the productivity of teachers. This will enlarge and also increase the achievement of high standard education in secondary schools leading to the revision and analysis of the current education system and making necessary plans to put technology in place for the future.

This research will lead to the use, implementation and development of technology as part of human resources as a strategy for the productivity of teachers in secondary schools. The purpose of this research is to discuss, examine and reexamine from different perspectives, viewpoints, and new ideas of teachers on how the role of technology can be improved in secondary schools as part of human resources on teacher productivity in education.

This work is based on qualitative and descriptive research. The interviews and observations will be carried out among five secondary schools with 25 teachers who work for the schools. The research will investigate what the teachers think about the incorporation of technology into school classrooms and its role in their classroom, as

a teacher, why it is important for a teacher to have mastery or knowledge and to learn the use of Technology, how the implementation and improvement of technology will enhance their productivity as teachers and how the use of technology in education motivate their scholars, student and learners to get more involved in learning and educational activities.

Keywords: Technology, Human Resource, Teachers Productivity, Development, Education.

ÖZET

EĞİTİMDE İNSAN KAYNAKLARI KAPSAMINDA TEKNOLOJİNİN ÖĞRETMENLERİN ÜRETKENLİĞİ ÜZERİNDEKİ ROLÜ

Adaugo Isidore Philiper

Eğitimde İnsan Kaynaklarını Geliştirme

Tez Danışmanı: Doç. Dr. Fatma KÖPRÜLÜ

Haziran 2023, 100 Sayfa

Günümüzde, teknoloji eğitimin her alanında. Yüz yüze, uzaktan ve kırsal alanlardaki okullardaki eğitimde kullanılan bilgisayar, internet, ücretsiz çevrimiçi platformlar, dijital öğrenim içerikleri, çevrimiçi eğitim kaynakları, ve/veya fiziksel teknolojik eğitim kaynaklarının hepsi teknolojinin kullanım şekil ve çeşitlerindendir.

İnsan kaynaklarının bir alanı olarak teknolojinin gelişimi öğretmenlerin üretkenliğini artırmada bir faktördür. Bu faktör ortaöğretimde yüksek standartta bir eğitimin gerçekleşmesine olanak tanıyacağından şu anki eğitim sisteminin de gözden geçirilmesine vesile olacaktır. Bu sayede de teknoloji gelecek için eğitimde yerini alacaktır.

Bu araştırma, ortaöğretimdeki öğretmenlerin üretkenliği için insan kaynakları dahilinde teknolojinin kullanılması ve gelişimine odaklanacaktır. Çalışmanın amacı insan kaynaklarının bir parçası olarak teknolojinin ortaöğretimdeki öğretmenlerin üretkenlikleri için nasıl geliştirilebileceğine dair öğretmenlerin görüşlerini, bakış açılarını almak bunları tartışmak ve incelemektir.

Çalışma nitel ve betimleyici bir çalışmadır. Mülakat ve gözlemler, beş ortaöğretim okulunda çalışan yirmi beş öğretmen ile yürütülecektir. Çalışmada öğretmenlerin, teknolojinin sınıftaki rolü, bir öğretmenin teknoloji hakkında bilgi sahibi olmasının ve teknolojiyi kullanmayı bilmesinin önemi, teknolojinin kullanımı ve gelişiminin kendi üretkenlikleri üzerinde nasıl bir etki yaratacağı ve teknoloji kullanımının öğrencileri

eğitim aktivitelerine katılım açısından nasıl motive edeceği hakkında görüşleri araştırılacaktır.

Anahtar kelimeler: Teknoloji, insan kaynakları, öğretmen üretkenliği, gelişim, eğitim.

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LIST OF ABBREVIATIONS

HRD	Human Resources Development
LMS	Learning Management System
PD	Professional Development
AR	Augmented Reality
VR	Virtual Reality
E-Learning	Electronic Learning
OER	Open Educational Resources
ICT	Information and Communication Technology
EdTech	Educational Technology
SRL	Self-Regulated Learning
TEL	Technology-Enhanced Learning

CHAPTER I

INTRODUCTION

Technology has advanced our world over the decades. Technology has transformed society, reshaping various aspects of daily life.

Technology is the application pertaining to human knowledge, skills, techniques and ideas to create goods and services, to solve problems or to achieve other goals.

Technology comprises of every process involved in creating a service or a product, starting from the idea of the product to the knowledge used to the finished product. In practice, it is more common for technology to be used to enhance conventional practice or supplement traditional activities, as observed in studies by Blin and Munro (2008), Eynon (2008), and Roberts (2003). Schools, houses, laptops, electricity, machines, cars, airplanes, phones, and various other products we have today are all outcomes of technology. Technology has revolutionized every aspect of our lives, encompassing education as well.

In recent years, the incorporation of technology in classrooms has become increasingly prevalent, with the aim of enhancing the instructional and learning process. Consequently, the role of technology in the productivity of teachers has become a critical area of research and development. In today's digital age, technology has become an integral part of every aspect of our lives, including education. The utilization of technology has transformed the manner in which teachers instruct and students acquire knowledge. It has not only made the learning process more interactive and engaging but has also significantly impacted the productivity of teachers. With the advent of new technologies, teachers now obtain access to a wide variety of digital tools, courses and resources that enable them generate and create captivating, interesting, engaging, fascinating and personalized valuable learning experiences for their students. This, in turn, has led to a significant improvement in the quality of education and the development of human resources in the education sector.

Secondly, human resources development in education has taken a new dimension, with educators using technology to improve their teaching methods, assess student performance, and collaborate with other educators globally. This research will inspect

and investigate the effect of technology on the productivity of teachers in Nigerian secondary schools, and how it has transformed human resources development in education. The Role of educational technology, is to explore the effect of technology on the acquisition, proficiency, and ethical application of digital tools in education, this involves the use of ICT, learning theories, video-conferencing, electronic white boards, E-books, assessment tasks, digital television, media, emails, projectors, innovative technology, digital cameras, technology in various content etc.

Researchers concur that there is no singularly "correct" technology or prescribed method of its utilization. Instead, it should align with the learning and teaching objectives of schools and be suitable for the students who engage with it [Sivin-Kachala & Bialo, 2000]. The role of digital tools in educational settings [technology] is to amplify and boast the instructional and educational activity and strengthen the connection between teachers and their students. It is very import to equip the teachers with knowledge, skills and values in technology as part of teacher's productivity in education in other to deliver instruction and a good quality learning and skills to their students. Take for example in times of crises the pandemic time, it was very important for the teachers to be prepared in teaching for online classes, distance learning through the usage [utilization] of technology. Technology is merely a tool, when it comes to fostering collaboration, getting kids to work together and motivation among students, the teachers play the most crucial role. [Bill Gates 2008] It is very important for educators to upgrade and cultivate their knowledge, expertise, and values in the utilization of technology and to equip their educating and acquiring knowledge [materials] to aids in the application of technology in education.

This research will range over the role of technology in enhancing the productivity of teachers as part of human resources development in education in Nigeria. Teachers need to more techie as technology have become one of the most used and source of learning in this 21st Century learners.

Integrating technology as part of human resources in teacher's productivity in Education will help make teaching and learning more fun and to develop the skills of their students because students are already interests and engaged in the use of technology, this will create many opportunities for the school and teachers for integrating technology as part of teaching and learning in the classroom.

A study by Scherer and Teo (2014) highlights the importance of considering teachers' attitudes towards technology when developing policies and programs to support the incorporation of technology in education. The study found that teachers' perceptions towards technology can significantly impact their utilization of technology in instructional settings and in the classroom. The role of technology in enhancing the productivity of teachers is multifaceted. Firstly, technology has made it possible for teachers to access and use a diverse range of digital tools, instruments, resources and assets that can help them in their daily work. For instance, Learning Management Systems (LMS) provide teachers with a centralized platform where they can create, manage, and deliver learning content to their students. Additionally, digital assessment tools make it easier for teachers to evaluate their students' progress and provide personalized feedback.

Thirdly, technology has also enabled teachers to collaborate and communicate more efficiently with their peers, students, and parents. With the use of online communication tools, teachers can easily share lesson plans, collaborate on projects, and communicate with parents about their students' progress. This has not only helped to improve the quality of education but has also enhanced the overall efficiency of the education system.

According to a report by the World Bank (2020), the COVID-19 global health crisis has underscored the significance of integrating technology in education. The report emphasizes the need for regulations, policy, plans, guidelines and programs that aids the development of digital infrastructure, provide teachers with the necessary training and support, and ensuring fairness, promote equitable, access and inclusivity in educational technology utilization for all students. Technology has provided teachers with prospect, with technology, teachers are presented with avenues to enrich their professional growth and development. With the availability of online courses and resources, teachers can now access training and development programs from anywhere in the world, at any time. This has helped teachers to update their knowledge and skills, and stay abreast of the latest developments in their field.

In conclusion, the role of technology in enhancing the productivity of teachers is essential in capacity building and professional growth and training in the educational sector. By leveraging digital tools and resources, teachers can create engaging and

personalized learning experiences for their students, collaborate more efficiently with their peers, and enhance their professional development. The incorporation of technology in the educational sphere has opened up new avenues for the growth and development of the education sector, and its benefits are evident in the improved or enhanced caliber of instruction and the overall effectiveness of the schooling system. Integrating technology in the classroom as part of the school teaching and learning culture will help prepare their students for jobs and to stand them out in future.

Using technology hand in hand with education, will prepare these students for a big and a brighter future.

- Technology helps to improve engagement in the class room. Engagement between students to students and students to teacher in the subject they are learning.
- Leveraging technology as a catalyst to amplify learning by enabling students to generate and showcase their understanding through diverse applications, thereby expressing ideas and fostering deeper comprehension.
- Wherever you encounter something remarkable, you will uncover the indelible influence of an exceptional teacher. [Arne Duncan 2020]

However, it is important to note that technology should not supplant the functions of the teacher in the classroom. The utilization of technology should be supplementary to the teacher's role and not a replacement for it. Teachers are still vital. Furthermore, technology should be employed to enrich the teacher-student relationship rather than impede it. Teachers are still required to provide guidance, support, and mentorship to their students. Moreover, technology should be used to enhance the teacher-student relationship and not hinder it.

The role of technology in enhancing the productivity of teachers is critical in the development of human resources in the education sector. It has provided teachers with novel prospects for building and to generate engaging and personalized educational experiences and opportunity for their students, collaborate more efficiently with their peers, and enhance their professional development. According to a study by Alshurideh and Alquraan (2020), the incorporation of technology in education has led

to increased student engagement and motivation, improved teacher productivity, and enhanced learning outcomes.

Technology should be used to complement the functions of the teacher in the classroom and not replace it. Policymakers and education stakeholders in Nigeria, must also address the digital divide to ascertain that all students have access to digital infrastructure and are not left behind in this digital age.

1.1 Statement of problem

The incorporation of technology in education has transformed the approach to teaching by educators and the learning experience for students. While there are so many benefits to integrating technology into the Educational system in Nigeria Secondary schools, there are also several challenges that need to be addressed.

One of the major challenges is the digital divide, which limits teachers' and students' ability to access digital devices and internet connectivity, particularly those from lower socio-economic backgrounds. This creates an inequality in education and hinders the professional growth of human resources in the education sector.

Additionally, In Nigeria, there are so many teachers who are not yet enlightened or trained on the use of technology in their classroom. In this study the role of technology as a part of human resources on the productivity of teachers in education is been covered. According to a study by OECD (2015), teachers face a range of challenges when integrating technology in education, including a lack of training and support, restricted or inadequate technological infrastructure and insufficient time and resources. The over-reliance on this technology may lead to a reduction in the teacher's role in the classroom, which could negatively impact the educational outcomes of the Secondary schools in Nigeria. Therefore, it is essential to explore these obstacles or challenges and discover approaches to mitigate them or address them to ensure that the assimilation and incorporation of technology in education in Nigeria is effective and equitable.

A study by Tondeur et al. (2018) found that while the majority of teachers use technology in their teaching, there are significant differences in the level of integration and the quality of use. This research will lead to the implementation, training and

development of teachers on technology as part of human resources as a strategy in the productivity of teachers in secondary schools in Nigeria.

Finally, the digital divide, using technology in Secondary school education should be addressed. Not all schools, teachers and students are equipped with digital tools and internet accessibility, which limits their ability to benefit from the use and to harness technology in their classroom.

It is therefore important for policymakers and education stakeholders to ensure that digital infrastructure is available to all teachers and their students, regardless of their socio-economic background.

1.2 Purpose of the study

The purpose of this study is to investigate, and discover the role of technology in enhancing the productivity of teachers as part of human resources development in education in secondary schools in Nigeria.

This study aims to:

Identify the benefits and challenges of using technology in the classrooms, particularly in enhancing the productivity of teachers.

Examine the impact of the digital divide on students' access to technology and the implications for the development and professional growth of human resources in the education sector.

Investigate the level of training and support provided to teachers to proficiently and effectively utilize technology in the classroom.

Explore the affordability and accessibility of technology in some remote areas where they have secondary schools in Nigeria.

Examine the impact of the digital divide on students' access to technology, and its impact on the quality of education in Nigeria.

This research will lead to the uses, implementation and development of technology as part of human resources as a strategy in the productivity of teachers in secondary schools in Nigeria.

Similarly, a study by Goktas, Yildirim, and Yildirim (2009) found that the usage of technology to enable learning in education can lead to improved teacher productivity and enhanced learning outcomes. In this study the role of technology as a part of human resources on the productivity of teachers in education is been covered.

The aim of this research is to discuss, examine and reexamine from different perspectives, viewpoints, and new ideas from teachers on how the role of technology can be improved in secondary schools in Nigeria as part of human resources on teacher's productivity in education.

1.3 Research Questions

1. Why is it important for teachers to have knowledge and to learn about the use of technology as an essential role in a digital classroom?

2. How has the role of teachers changed with the usage of technology in the classroom?

3. How does the integration of technology affect the learning of students?

4. How do you think the implementation and improvement of technology will enhance the teacher's productivity in education?

1.4 Significance of the Study

This study focus on the significant sector;

The findings of this study will offer valuable insights into technological competence and effective usage of technology in enhancing the productivity of teachers and promoting the development of human resources in the education sector. Moreover, the study will contribute to the sustained ongoing conversation or discussion on the role of technology in education and help inform policymakers and education stakeholders during their decision-making processes.

The development of technology as part of human resources in education, serving as a catalyst to enhance the productivity of teachers. This will increase the teacher's productivity and completion of high standard education in secondary schools in Nigeria, which consequently necessitates the evaluation and examination of the

current education system and the formulation of essential strategies for implementing technology in the future

The study will also be useful to educators and teachers, as it will provide insights into the efficient utilization of technology in the classroom and the necessity to achieve a harmonious equilibrium between technology and traditional teaching methods to foster the cultivation of analytical thinking and solution-oriented abilities among students. Moreover, this study will contribute to the objective of ensuring equal availability and accessibility to quality universal education for all students, irrespective of their socio-economic background, by advocating for the effective utilization of technology in education.

This study will enrich the existing knowledge base and contribute to the collective understanding on the role of technology in education, particularly in enhancing the productivity of teachers and promoting the development of human resources.

1.5 Delimitations of the Study

In this research paper, the following subjects are excluded:

The private life of teachers and all participants of this research will not be included. Also a detailed information of the schools participating in this research will be private and anonymous.

This study will be restricted to the use of the English language, as it is the predominant medium of instruction in the majority of educational systems worldwide. Therefore, the findings of this study may not be applicable to secondary schools in remote areas that use other languages [local language] as their primary language of instruction.

Despite these delimitations, the study's findings will provide valuable insights the optimal utilization of technology in education, particularly in enhancing the productivity of teachers and promoting the development of human resources.

1.7 Limitations of the Study

Essential components of technology may not be included or implemented due to lack of financial support.

This study's findings will be based on the subjective experiences and perceptions of a selected group of participants. This means that the findings may not be generalizable to a larger or broader population. The study's sample size may be limited, and therefore, the findings may not fully represent the diversity of experiences and perspectives of teachers and education stakeholders. More studies are needed before major investments on the role of technology as part of human resources development in education on teacher's productivity in Nigeria secondary schools.

Many schools integrate the introduction of technology with other educational reforms, making it challenging to isolate the specific impact of the technology component. The incorporation of technology into classrooms changed other variables, eg; the teacher's role, the students study habits, which may cause modifications in students' academic outcomes or conduct [Bonje, 2006; Honey et 2005, Fouts 2000, Roschelle et 2000.

1.6 Definition of terms;

INTEGRATING; to combine to or more things in other to become effective. To mix with and join the society of a group of peoples, often changing to suit their way of life, habit, and customs.

Skills; to have knowledge or comprehension, discern. The capacity to do something well, techniques, ability, and skills can either be acquired or learned. To have personal or practical knowledge. To be an expert or practical on something.

Aids; to help, assistance, relief, succor. Something which helps, a material source of help. A helper or assistance, to give support.

Education; to bring forth or bring up. Education is often perceived as the process of transmitting the values and accumulated knowledge of a society. It is designed to guide individuals, particularly children, in learning about culture, shaping their behavior according to the expectations of adulthood, and preparing them for their future roles in society. The amount of knowledge to be transferred from one generation to another in this context could be referred to as "intergenerational knowledge transfer" or "knowledge dissemination across generations."

Implementation; is a term in this research study that can be understood in the context as providing agnatic approach to achieve a particular goal or put something into action. It refers to the process of achieving a specific objective or executing a specific instruction.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

In recent years, technology has become an increasingly important part of education, with the potential to transform teaching and learning in many ways. One area in which technology has had a significant impact is on the productivity of teachers. As education systems around the world face mounting pressures to improve outcomes with limited resources, technology offers a promising way to increase teacher productivity and help schools meet their goals.

A growing body of literature has explored the role of technology in improving teacher productivity, examining the ways in which technology can be used to streamline administrative tasks, enhance communication between teachers and students, and support more personalized and effective teaching strategies. A review by Sonmark et al. (2017) examined the potential of technology to enhance teacher professional development. The review found that technology can enable teachers to access a wider range of professional development opportunities, including online courses and communities of practice, and can also provide more personalized and just-in-time support.

This literature will have provided valuable insights into the benefits and challenges of using technology to support teaching and learning, and will highlight the need for careful planning and effective implementation strategies to ensure that technology is used in ways that are truly productive and effective.

In this literature review, we will explore some of the key research on the role of technology in enhancing teacher productivity in Education. We will examine the various ways in which technology can be used to support teachers in their work, and consider the potential benefits and challenges associated with each approach. We will also examine the theoretical frameworks that have been used to guide research in this area, and explore some of the key findings and recommendations that have emerged from previous studies.

Through this review, the researcher aims to offer a comprehensive portrayal current state of knowledge on the topic of technology and teacher productivity, and to identify

areas where further research is needed to deepen our understanding of this important issue.

To achieve these objectives, I organized review around several key themes, including the use of technology to streamline administrative tasks, support communication and collaboration among teachers and students, and facilitate more personalized and effective teaching strategies. I also examine the role of professional development in supporting teachers to use technology in their work, and consider the broader social, cultural, and political factors that shape the adoption and implementation of technology in education in Nigeria Secondary Schools. One key area of this research that we will explore is the use of learning management systems (LMS) and other educational technologies to support administrative tasks such as grading, record-keeping, and lesson planning.

Studies have found that LMS can save teachers significant amounts of time and energy by automating routine tasks and providing tools for more efficient organization and communication. However, there are also concerns that the use of such technologies can create additional administrative burdens for teachers, and may distract from more meaningful teaching and learning activities.

Another important area of this research is that we will examine the impact and influence of technology in supporting communication and collaboration among teachers and students. Moursund (2016) said the capacity and potential of technology to support project-based learning. The study found that technology can facilitate collaboration, research, and creativity in project-based learning, and can also enable students to showcase their work in a variety of formats, including multimedia presentations and digital portfolios.

Technologies such as social media, video conferencing, and mobile devices can provide new opportunities for teachers and students to connect and collaborate, and can support more personalized and flexible approaches to teaching instructions and learning. However, there are also concerns about the potential for these technologies to distract from face-to-face interaction, and to exacerbate existing inequalities in access and participation. We will also explore the impact of professional development in supporting teachers to use technology effectively in their work. Studies have found that effective professional development programs can help teachers to cultivate the

skills and confidence needed to integrate technology into their teaching practice, and can support more effective use of technology in the classroom. However, there are also challenges associated with designing and implementing effective professional development programs, including the need to align training with teachers' specific needs and goals, and the need to provide ongoing support and feedback.

Overall, this literature review strives to offer a comprehensive overview of the key research on the role of technology in enhancing teacher productivity. Through this review, I hope to identify gaps in the existing literature, highlight promising areas for future research, and provide guidance to educators, policymakers, and researchers on the most effective ways to use technology to support teaching and learning in Education system in Nigeria.

2.2 Conceptual framework;

As part of my review, I will first explore the various ways in which technology can support teacher productivity. This conceptual framework consists of a number of connected components and variables that can be used as a tool for resolving issues faced with in the real world. Imenda, (2014) describes it as the last eyepiece through which you can see the logical remedy of an existing problem. One area of focus will be the use of technology to streamline administrative tasks, such as grading and record-keeping. Research has shown that technology tools like learning management systems and gradebook software can help teachers save time and improve the accuracy and efficiency of their administrative tasks (Bowers & Christensen, 2018; Means et al., 2010). Conceptual framework development begins with a logical presupposition that an issue is present, and strategies, tactics, methodologies, or models, may be used to resolve the issue,(Zackoff et al., 2019). Another area of focus will be the use of technology to enhance communication between teachers and students, such as through online discussion forums and video conferencing tools. These tools can help teachers to better understand student needs and provide more personalized support, while also facilitating more frequent and efficient communication between teachers and students (Dabbagh & Kitsantas, 2012).

Technology can support more effective teaching strategies, such as through the use of multimedia resources, digital simulations and games, and other interactive learning tools. Research has shown that these tools can help to engage students and promote

deeper learning, while also allowing teachers to provide more targeted and personalized feedback to individual students (Yilmaz, 2017). Additionally, we will explore the ways in which technology can support the development of teacher skills and knowledge, such as through online professional development courses and social learning networks. These resources can help teachers to stay up-to-date with the latest research and best practices, and provide opportunities for collaboration and knowledge-sharing with colleagues (Paavola et al., 2004).

Throughout this review, will also consider some of the key challenges and limitations associated with using technology to support teacher productivity. These may include issues related to the accessibility and equity of technology resources, the need for appropriate training and support for teachers, and concerns about the potential for technology to exacerbate existing inequities and inequalities in education. By considering these challenges alongside the potential benefits of technology, to aim at to provide a balanced and nuanced understanding of the complex issues involved in using technology to enhance teacher productivity.

Overall, this review will provide a thorough examination of the current state of knowledge on the role of technology in enhancing teacher productivity.

By synthesizing insights from a range of theoretical and empirical sources, this aim to identify key trends, gaps, and opportunities for future research in this area, while also providing practical recommendations for educators and policymakers seeking to harness the potential of technology to improve education outcomes.

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Overall, this review will provide a thorough examination of the current state of knowledge on the role of technology in enhancing teacher productivity. By synthesizing insights from a range of theoretical and empirical sources, this aim to identify key trends, gaps, and opportunities for future research in this area, while also providing practical recommendations for educators and policymakers seeking to harness the potential of technology to improve education outcomes in Nigeria. Through this review, this research aims to contribute to a better understanding of the potential of technology to enhance teacher productivity, and to provide practical guidance for educators and policymakers seeking to harness the power of technology to improve education outcomes in Nigeria. By synthesizing insights from a range of empirical and theoretical sources, this aim to provide a comprehensive and nuanced understanding of this important issue.

2.3 Related Research;

The importance of social and environmental factors in shaping learning outcomes (Bandura, 1986), and the community of inquiry model, which focuses on the importance of collaboration and social interaction in promoting deep and meaningful learning (Garrison et al., 2000). Adult learning, which highlight the importance of self-directed and experiential learning for adult learners (Knowles, 1984), as well as theories of instructional design, which provide guidance on how to design effective and engaging learning experiences (Merrill, 2002). These studies provide evidence of the potential of technology to enhance teacher productivity as part of human resources development in education. However, they also highlight the need for careful planning and implementation to ensure that technology is used effectively and in a way that promotes equity and accessibility for all students. The use of automated grading and

assessment tools may reinforce existing biases in grading practices and perpetuate systemic inequalities (Enyedy et al., 2015). The utilization of digital platforms for teaching and learning may exacerbate issues of surveillance and control, particularly in contexts where student data is collected and used for commercial purposes (Williamson, 2018). A study by Inan and Lowther (2010) examined the impact of using technology on teacher productivity in terms of lesson planning, grading, and communication with students and parents. The study found that technology use can significantly enhance teacher productivity and reduce the time required for administrative tasks.

A case study by Agyei and Voogt (2010) examined the impact of a technology-based professional development program on teacher productivity in Ghana. The study found that the program led to significant improvements in teacher productivity, with teachers reporting that they were better able to manage their time, communicate with students and colleagues, and create effective lesson plans. A survey conducted by the National Center for Education Statistics (NCES) in 2018 found that the majority of teachers in the US use technology for instructional purposes, with 59% of teachers reporting that they use technology to communicate with students, 54% using it to create or deliver instructional materials, and 53% using it for professional development. An experiment by Hsin and Cigas (2013) examined the impact of using a flipped classroom model, which involves using technology to deliver instructional content outside of class time, on teacher productivity. The study found that the flipped classroom model led to significant improvements in teacher productivity, with teachers reporting that they were better able to focus on individual student needs and provide more personalized instruction. A study by Kirschner and van Merriënboer (2013) examined the impact of technology on collaborative learning among teachers. The study found that technology can facilitate communication and collaboration among teachers, enabling them to share ideas and resources and collaborate more effectively on instructional design and delivery.

Other research Explored the challenges and limitations associated with the use of technology in enhancing teacher productivity. A study by Ertmer et al. (2012) examined the challenges faced by teachers in integrating technology into their instructional practices. The study found that teachers face a range of barriers, including lack of access to technology, inadequate training and support, and concerns about the

quality and reliability of educational technology. A review by Means et al. (2017) examined the evidence on the impact of educational technology on student learning outcomes. The review found that while technology can enhance student learning in certain contexts, the impact is highly dependent on how the technology is used and the quality of instructional design. A study by Ertmer and Ottenbreit-Leftwich (2010) examined the role of technology in promoting equity and access in education. The study found that while technology has the potential to address inequalities in educational opportunities, it can also create new forms of inequality if not implemented in a thoughtful and equitable manner. A study by Tondeur et al. (2017) examined the digital competence of teachers and found that many teachers lack the skills and confidence needed to integrate technology into their instructional practices effectively. They also emphasize the importance of engaging teachers in the design and implementation of technology-based initiatives to ensure that these initiatives align with their instructional goals and pedagogical practices.

In Addition, related research has also explored the potential benefits challenges and limitations of technology in enhancing teacher productivity in various aspects of teaching and learning, including assessment, feedback, and collaboration. A study by Kirschner and van Merriënboer (2013) examined the impact of technology on collaborative learning among teachers. These study found that technology can facilitate communication and collaboration among teachers, enabling them to share ideas and resources and collaborate more effectively on instructional design and delivery. Another study by Black and Wiliam (1998) found that technology-based assessment tools can improve the quality of feedback provided to students and enhance their learning outcomes. These study also found that technology can enable teachers to collect and analyze student data more efficiently and accurately, allowing for more effective differentiation and personalized instruction. These studies have provided further evidence of the potential benefits of technology in enhancing teacher productivity and improving the quality of teaching and learning. However, they also highlight the importance of careful planning and implementation to ensure that technology is used in a way that aligns with instructional goals and is grounded in research-based best practices in Education. These studies also provide valuable insights into the various factors that influence the integration of technology in teaching

and learning, including teachers' knowledge, beliefs, and attitudes, as well as the impact of technology on student achievement and teacher job satisfaction.

Overall, these studies suggest that while technology has the potential to enhance teacher productivity as part of human resources development in education, careful planning and implementation are essential to ensure that technology is used effectively and in a way that promotes equity and access for all students. These studies also highlight the need for ongoing research and evaluation to better understand the impact of technology on teaching and learning, and to identify best practices for integrating technology into instructional practices.

These studies also highlight the need for professional development and support to help teachers develop their digital competence and use technology more effectively. The also emphasized the importance of addressing the barriers and challenges that teachers may face in using technology effectively. These barriers include factors such as access to technology and digital literacy skills, as well as concerns around workload and the potential for technology to replace teachers. These studies highlight the need for a comprehensive approach to integrating technology into teaching and learning, which includes addressing the barriers and challenges faced by teachers and providing them with the support and resources needed to use technology effectively.

2.4 Examination of the different types of technology used in education, including hardware, software, and digital resources;

Technology has gained popularity in recent years is learning management systems (LMS), which are online platforms that enable teachers to manage and deliver educational content and activities to students. Research by Means and colleagues (2014) found that the use of LMS improved teacher productivity by reducing administrative workload and enabling more efficient communication with students. Several studies have explored the impact of specific technologies on teacher productivity. For example, interactive whiteboards (IWBs) have been found to have positive effects on teacher productivity, student engagement, and learning outcomes (Bennett, Maton, & Kervin, 2008; Hagger & McIntyre, 2015). Similarly, tablet devices have been found to enhance teacher productivity by providing flexibility, mobility, and access to digital resources and educational apps (Tondeur, van Braak, & Valcke, 2017).

Technology has become a ubiquitous part of modern education, and encompasses a wide range of tools and resources that can be used to support teaching and learning. These can be broadly divided into three categories: hardware, software, and digital resources.

2.4.1 Hardware;

this refers to physical equipment and devices that are used in educational settings, such as computers, tablets, interactive whiteboards, and projectors. These devices provide a platform for software and digital resources to be used in the classroom, and can also facilitate communication and collaboration among students and teachers.

2.4.2 Software;

this includes a wide range of applications and programs that can be used for instructional purposes, such as learning management systems (LMS), educational games and simulations, and productivity tools like word processors and presentation software. Software can be used to create interactive and engaging learning experiences, and can also support student-centered approaches to teaching and learning, such as personalized and self-directed learning.

2.4.3 Digital resources;

refer to online materials and content that can be used in educational settings, such as eBooks, videos, interactive tutorials, and online courses. These resources provide access to a vast array of information and learning opportunities, and can be accessed anytime and anywhere, making them particularly useful for distance learning and remote instruction.

Each of these types of technology has unique benefits and limitations, and can be used in a variety of ways to support teaching and learning. For example, hardware can be used to provide access to software and digital resources, as well as facilitate communication and collaboration among students and teachers. Software can be used to create interactive and engaging learning experiences, and can also support student-centered approaches to teaching and learning. Digital resources can provide access to a vast array of information and learning opportunities, and can be accessed anytime and anywhere. In conclusion, technology is an integral part of modern education, and encompasses a wide range of tools and resources that can be used to support teaching and learning. Understanding the different types of technology, and how they can be

used in educational settings, is an important step in leveraging technology to improve the quality and effectiveness of education as part of human resources development.

2.5 The role of technology in education

Technology has played an increasingly important role in education over the past few decades, with the widespread adoption of digital devices, software, and online platforms in classrooms and learning environments. Some of the key ways in which technology has transformed education include:

2.5.1 Access to information:

Technology has made it easier for students to access a vast array of information and resources, including textbooks, articles, videos, and online courses. This has made education more accessible to learners of all ages and backgrounds, and has also provided opportunities for self-directed learning and lifelong learning.

2.5.2 Personalized learning:

Technology can be used to personalize instruction to meet the needs and preferences of individual learners. Adaptive learning software, for example, can adjust the pace and difficulty level of content based on the student's performance, while online assessments can provide instant feedback and targeted remediation.

2.5.3 Collaboration and communication:

Technology has made it easier for students and teachers to collaborate and communicate with one another, both within and outside of the classroom. Online discussion forums, video conferencing tools, and collaborative software platforms can facilitate communication and enable collaborative learning activities.

2.5.4 Engaging and immersive learning experiences:

Technology can provide students with engaging and immersive learning experiences that incorporate multimedia elements, interactive simulations, and gamification. These approaches can help to increase student motivation, engagement, and enjoyment of learning.

2.5.5 Efficient and effective assessment:

Technology can enable teachers to assess student learning more efficiently and effectively, through the use of online assessments, automated grading, and data analytics. This can provide teachers with more accurate and timely feedback on student progress, and can help to inform instructional decision-making.

2.5.6 Professional development:

Technology has also provided teachers with new opportunities for professional development and continuing education. Online courses, webinars, and other digital resources can help teachers to stay up-to-date with the latest research and best practices, and to develop new skills and knowledge.

2.5.7 Administrative tasks:

Technology can help to streamline administrative tasks such as attendance tracking, grading, and lesson planning, freeing up teachers' time for more important instructional activities. This can help to reduce teacher workload and increase their productivity.

2.5.8 Inclusivity:

Technology can help to promote inclusivity and support diverse learners, by providing accessibility features such as closed captioning, screen readers, and translation tools. Online learning can also help to address geographical barriers and provide educational opportunities to learners in remote or underserved areas.

2.5.9 Parental involvement:

A study by Akcaoglu and Lee (2016) explored the use of mobile technology in supporting teacher productivity. The findings suggested that the use of mobile devices, such as tablets and smartphones, can help to enhance teacher efficiency and organization, allowing them to access information and resources more easily and quickly, and increasing their ability to communicate with students and parents. Technology can facilitate communication between teachers and parents, through the use of online portals, messaging systems, and other digital tools. This can help to promote parental involvement in their child's education and provide opportunities for collaboration and support.

2.5.10 Professional development:

a study by Wang and Li (2018) investigated the use of technology-enhanced teacher professional development in China. The results indicated that technology can provide teachers with personalized and flexible professional development opportunities, and can help to improve their knowledge and skills, as well as their teaching practices and student learning outcomes. Technology can also play an important role in the professional development of teachers. Online courses, webinars, and virtual

conferences can provide opportunities for teachers to stay up-to-date with the latest research and best practices, and to connect with other educators around the world.

2.5.11 Accessibility and inclusion:

Technology can help to increase accessibility and promote inclusion in education. Assistive technologies, such as text-to-speech software, can support learners with disabilities, while online platforms and digital resources can help to break down barriers related to location, language, and socioeconomic status.

2.5.12 Data-driven decision making:

Technology can provide teachers and administrators with access to a wealth of data on student performance, engagement, and other metrics. This data can be used to inform decision-making related to curriculum development, instructional strategies, and resource allocation.

2.5.13 Distance learning:

Technology has become particularly important in the context of distance learning, as more and more students are participating in online courses and programs. Technology can enable teachers to deliver high-quality instruction remotely, and can provide students with access to learning opportunities from anywhere in the world.

2.5.14 Innovation and creativity:

Finally, technology can foster innovation and creativity in education, by providing opportunities for students and teachers to experiment with new approaches and tools. From virtual reality simulations to coding and robotics, technology can inspire curiosity, problem-solving skills, and a lifelong love of learning.

2.6 The impact of technology

A study by Ertmer and Ottenbreit-Leftwich (2010) found that teacher beliefs and attitudes towards technology influenced their use of technology in the classroom, highlighting the importance of addressing teacher perceptions and attitudes towards technology as part of any technology integration effort.

The impact of technology on education has been significant and far-reaching, with both positive and negative effects. On the positive side, technology has provided students with access to a vast array of resources and learning opportunities, personalized instruction, engaging and immersive learning experiences, and increased accessibility and inclusion. Teachers have also benefited from technology, with

opportunities for professional development, data-driven decision making, and the ability to reach students through distance learning.

However, there are also potential drawbacks to the use of technology in education. One concern is the potential for technology to be a distraction or to decrease student engagement and social interaction. There are also concerns around issues such as privacy and data security, the digital divide, and the potential for technology to exacerbate existing inequalities in education.

Overall, the impact of technology on education is complex and multifaceted, and its benefits and limitations are likely to continue to be debated and studied in the years to come. However, it is clear that technology has already had a significant impact on education, and its role in shaping the future of learning and teaching is likely to be increasingly important.

2.6.1 The impact of technology on education as part of human resource development in education and its significant;

The impact of technology on education as part of human resource development in education has transformed the way teachers teach and students learn. Technology has become an essential tool for educators, helping to increase the effectiveness and efficiency of teaching and learning. A study by Tondeur, Van Braak, and Valcke (2017) explored the use of technology in supporting teacher professional development. The results indicated that technology can help to provide teachers with access to a wider range of professional development opportunities, including online courses, webinars, and digital resources. This, in turn, can help to enhance teacher knowledge and skills, and ultimately improve their productivity and effectiveness in the classroom Warschauer, M., & Matuchniak, T. (2010. These studies suggest that technology can have a positive impact on teacher productivity in education, particularly when it is used to support collaboration, automate administrative tasks, and provide access to professional development opportunities Tondeur, J., van Braak, J., Sang, G., Voogt, J., Fisser, P., & Ottenbreit-Leftwich, A. (2017). However, it is important to note that the successful integration of technology into teaching and learning requires ongoing support, training, and investment, and must be grounded in pedagogical principles that prioritize student learning outcomes.

By using technology, educators can provide personalized learning experiences for their students, which can help them to improve their skills and knowledge in a way that suits their individual needs and learning styles. This can also help to increase student engagement and motivation, as students are more likely to be interested in learning when it is tailored to their specific interests and needs.

Technology can also be used to provide teachers with professional development opportunities, allowing them to stay up-to-date with the latest research and best practices in education Sonmark, K., Östlund, C., & Sundberg, D. (2017). A systematic review of technology-enhanced professional learning for teachers. This can help them to improve their teaching skills and knowledge, which can ultimately lead to better learning outcomes for their students Black, P., & Wiliam, D. (2016). In addition, technology can help to increase accessibility and promote inclusion in education. By providing assistive technologies, such as text-to-speech software and closed-captioning, students with disabilities can access the same learning resources as their peers. This can help to break down barriers related to disability and ensure that all students have an equal opportunity to learn.

Overall, technology has the potential to play a vital role in human resource development in education, by providing educators with the tools they need to deliver high-quality instruction and support student learning. As technology continues to evolve, it is likely that its impact on education and human resource development will only continue to grow in importance.

However, it is important to note that the use of technology in education is not without its challenges. One of the main challenges is ensuring that educators have the necessary skills and knowledge to effectively use technology in their teaching. This requires ongoing training and professional development to help educators stay up-to-date with the latest technologies and teaching methods.

Another challenge is ensuring that all students have access to technology, regardless of their socioeconomic status. This requires a concerted effort to bridge the digital divide and provide equal access to technology and resources for all students.

Furthermore, there are concerns about the potential for technology to decrease the amount of social interaction and collaboration in the classroom. While technology can certainly enhance learning, it is important to ensure that it does not replace the

important human interactions that are necessary for student development and well-being.

Overall, the impact of technology on education as part of human resource development is significant, and its potential for improving teaching and learning outcomes is immense. However, it is important to approach the use of technology in education with caution, and to carefully consider the potential benefits and drawbacks before implementing it in the classroom.

Overall, the role of technology in education is constantly evolving, with new innovations and tools emerging all the time. While there are challenges and limitations to the use of technology in education, its potential to enhance teaching and learning outcomes is widely recognized, and it is likely to continue to play a central role in the future of education.

2.6.2 Support assessment and evaluation;

technology can also help to support assessment and evaluation, providing teachers with real-time data on student progress and enabling them to adjust instruction accordingly. This can help to personalize learning and ensure that each student is able to reach their full potential.

Technology has had a significant impact on education in recent years, transforming teaching and learning in a variety of ways. While there are challenges and concerns associated with the use of technology in education, its potential to support teacher productivity, enhance student learning outcomes, and promote inclusivity and accessibility is widely recognized.

2.6.3 Facilitate partnerships and collaborations;

Technology can also facilitate partnerships and collaborations between schools, universities, and other organizations, helping to build networks of support and resources that can benefit learners and educators alike. This can also support the ongoing development of human resources in education, by providing opportunities for professional growth and collaboration.

The impact of technology on education as part of human resources development is significant and multifaceted, with the potential to support teaching and learning outcomes, promote accessibility and inclusion, foster innovation and creativity, and support ongoing professional development for educators. By exploring the potential

benefits and challenges of technology in education, we can continue to improve teaching and learning outcomes, promote equity and inclusion, and support the ongoing development of human resources in education.

2.6.4 Technology in education as part of human resources development;

Research has shown that the use of technology can have a positive impact on teacher productivity. For instance, a study by Xu and Jaggars (2013) found that the use of a learning management system (LMS) improved teacher efficiency by reducing administrative workload and enabling teachers to provide more timely feedback to students. Another study by Tsai and Chai (2012) found that the use of tablet devices in the classroom improved teacher productivity by facilitating more efficient lesson planning and instructional delivery.it is important to examine some specific examples of how technology has been used in different educational settings. One such example is the use of online and blended learning models, which have become increasingly popular in recent years.

2.6.5 Online and blended learning models;

A study by Levin and Wadmany (2006) found that online professional development programs can be effective in promoting teacher learning and growth, particularly when they are designed to be interactive, collaborative, and aligned with teachers' interests and needs. This involve the use of technology to deliver instructional content and support student learning, often through a combination of online and face-to-face instruction. These models have been shown to have several benefits, including increased flexibility and accessibility, personalized learning experiences, and improved student engagement and motivation.

2.6.6 The use of educational software and applications;

The use of online professional development has been found to enhance teacher productivity by providing flexible and accessible learning opportunities. A study by Darling-Hammond and colleagues (2017) found that online PD was as effective as face-to-face PD in improving teacher knowledge and skills, while also providing the benefits of flexibility and cost-effectiveness.

The role of technology in education involve the use of educational software and applications, which can support learning and provide students with opportunities for

practice and feedback. Educational software can range from simple programs that support basic skills development, such as math and reading, to more complex simulations and games that support higher-order thinking and problem-solving skills.

2.6.7 Support teacher professional development and opportunities;

A study by Saba and Shearer (2014) examined the impact of technology-supported instruction on teacher workload and job satisfaction. The findings suggested that technology can help to reduce teacher workload and increase job satisfaction, particularly when it is used to automate administrative tasks and provide teachers with more time for lesson planning and professional development. Technology also serve as a tool used to support teacher professional development, by providing opportunities for online learning and collaboration, access to resources and professional networks, and tools for assessment and evaluation. This can help to support ongoing professional growth and development, and ensure that teachers are equipped with the skills and knowledge necessary to effectively integrate technology into their teaching practice. Technology has the potential to significantly impact education as part of human resources development, by providing new opportunities for teaching and learning, supporting professional growth and collaboration, and promoting equity and inclusion.

2.7 Challenges and concerns to consider;

The integration of technology into education also presents challenges and requires careful planning and implementation. A study by Teo and colleagues (2013) identified factors such as teacher attitudes and beliefs, technological infrastructure, and support for professional development as important considerations in the successful integration of technology into teaching and learning. In addition to the benefits of technology in education, there are also some potential challenges, unintended potential challenges and concerns to consider. While technology has the potential to enhance teacher productivity, it can also lead to additional challenges such as increased screen time and the need for additional training and support (Zhang et al., 2018). Additionally, the integration of technology into teaching practices must be done in a way that aligns with the needs and goals of the specific classroom, taking into account factors such as student learning styles, teacher preferences, and the availability of resources (Robinson, 2018). Technology has the potential to significantly impact education as part of human resources development, by providing new opportunities for teaching

and learning, supporting professional growth and collaboration, and promoting equity and inclusion. However, it is crucial to consider the potential challenges and concerns associated with technology, and to ensure that it is being used in responsible and effective ways that support the needs of all learners and educators.

2.8 The issue of access and equity;

A research by Zhang and colleagues (2016) found that teachers in rural areas may face challenges in accessing technology and digital resources, leading to lower levels of technology integration and reduced productivity. Therefore, it is important to ensure equitable access to technology and digital resources for all teachers. The use of technology for teacher productivity is the availability and accessibility of digital resources and tools.

One major challenge is the issue of access and equity. While technology can provide new opportunities for learning and professional development, it is important to ensure that all students and teachers have equal access to these tools and resources. This includes providing access to high-quality hardware and software, as well as ensuring that teachers and students have the skills and knowledge necessary to effectively use these tools.

2.9 Distraction or a lead to a decrease in face-to-face interaction;

A study by Darling-Hammond and colleagues (2017) found that online PD was as effective as face-to-face PD in improving teacher knowledge and skills, while also providing the benefits of flexibility and cost-effectiveness. Another challenge is the potential for technology to be a distraction or to lead to a decrease in face-to-face interaction and social skills. This is true for younger students, who may be more prone to distraction and who need opportunities for social and emotional development. It is important to consider how technology is being used in the classroom and to ensure that it is being used in ways that support, rather than detract from, learning and development. The importance of a supportive school culture and leadership in fostering the effective use of technology in education and enhancing teacher productivity (Zhang et al., 2018). Schools that provide a positive and supportive environment for technology use, including adequate resources, time, and support for

teacher professional development, are more likely to see successful integration and use of technology in teaching practices.

2.10 Existing inequalities and biases;

The challenges associated with technology integration, there are also concerns about the potential for technology to exacerbate existing inequalities in education. For example, research has shown that students from low-income families and marginalized communities may have limited access to technology and digital resources, which can impact their ability to benefit from technology-supported instruction (Warschauer & Matuchniak, 2010). There are also concerns about the potential for technology to reinforce existing power structures and biases in education, such as through algorithmic bias in adaptive learning programs or the use of surveillance technologies in schools (Selwyn, 2016). These issues highlight the need for critical engagement with technology in education and ongoing efforts to address equity and social justice in the design and implementation of technology-supported instruction.

There are concerns about the potential for technology to exacerbate existing inequalities and biases. For example, algorithms used in educational software may be biased towards certain groups of students, and the use of technology may lead to a decrease in the personalization and individualization of learning. It is important to be aware of these potential biases and to take steps to mitigate them, such as by using diverse and inclusive materials and providing opportunities for personalized and differentiated learning.

2.11 One-size-fits-all solution;

The impact of technology on teacher productivity is not always straightforward. Some studies have found that the use of technology can lead to increased workload, particularly when teachers are required to learn new tools and software (Roberts-Holmes, 2018). Additionally, the use of technology can be disruptive to classroom dynamics if not used effectively, which may ultimately impact student outcomes (Schaffhauser, 2018).

It is important to note that the impact of technology on education as part of human resources development is not a one-size-fits-all solution. The effectiveness of

technology in education depends on various factors, including the learning environment, the available resources and infrastructure, the pedagogical approach, and the needs and preferences of learners and educators.

Therefore, it is crucial for educators and policymakers to consider these factors as the integrating technology into education. This can involve assessing the readiness and capacity of schools and teachers to implement technology, as well as providing appropriate training and support to ensure that technology is used in effective and responsible ways.

2.12 The potential challenges of technology in education;

While the potential benefits of technology for teacher productivity are clear, there are also potential drawbacks and challenges to consider. For example, the use of technology can be time-consuming and may require additional training and support for teachers (Lei & Zhao, 2017). The use of technology can also lead to concerns around data privacy and security (Nelson, 2017).

To fully realize the potential of technology in education in Nigeria secondary schools, it is important to consider not only the tools and resources available, but also the pedagogical approaches and strategies that can support effective use of technology. For example, a focus on student-centered and inquiry-based learning can help to ensure that technology is used to support active and engaged learning experiences, rather than simply as a passive tool for information consumption.

2.12.1 The potential unintended consequences of technology;

There are also some challenges associated with the use of technology in teacher productivity. For example, a study by Johnson et al. (2016) explored the impact of technology on teacher workload, stress, and burnout. The findings suggested that while technology can help to automate administrative tasks, it can also increase teacher workload and stress if not implemented effectively or if teachers lack adequate training and support. it is important to consider the potential unintended consequences of technology in education, such as the learning environment, the availability of resources and infrastructure, the risk of increasing inequalities and exacerbating existing disparities. For example, students from disadvantaged backgrounds may not have equal access to technology or may not be able to use it effectively, which can

further widen the achievement gap. The importance of a supportive school culture and leadership in fostering the effective use of technology in education and enhancing teacher productivity (Zhang et al., 2018). Schools that provide a positive and supportive environment for technology use, including adequate resources, time, and support for teacher professional development, are more likely to see successful integration and use of technology in teaching practices.

To mitigate these risks, it is important to ensure that technology is used in ways that promote equity and inclusion, such as by providing equal access to technology and support, promoting digital literacy, and addressing the needs of diverse learners. Technology has the potential to significantly impact education as part of human resources development, but it is crucial to consider the context and needs of learners and educators when implementing technology in education. By promoting responsible and effective use of technology, we can support the ongoing development of human resources in education and improve teaching and learning outcomes for all learners. Additionally, the use of technology in education raises important ethical and privacy concerns, particularly when it comes to the collection and use of student data. As such, it is important for educators and policymakers to consider the ethical and social implications of technology use in education, and to develop policies and guidelines that promote responsible and effective use.

2.13 The overview of the concept of productivity in education;

The concept of productivity in education has been widely discussed in the literature. Productivity refers to the efficiency and effectiveness with which educational resources are utilized to achieve desired educational outcomes (Chapman & Brown, 2016). It is an important concept in education as it relates to the ability of educational institutions to meet their goals and objectives, and to provide high-quality educational experiences for students.

In the context of teaching, productivity can be defined as the ability of teachers to achieve their teaching goals and objectives in an efficient and effective manner (Bailey, 2015). This includes the ability of teachers to manage their time effectively, to engage students in learning, and to provide meaningful feedback on student work. Productive teachers are also able to balance their workload effectively, ensuring that they have adequate time and resources to plan, deliver, and assess their lessons. The

literature suggests that teacher productivity is influenced by a range of factors, including teacher characteristics (such as experience and qualifications), classroom environment, and the use of effective teaching strategies and resources (Bailey, 2015; Brophy, 2017). Additionally, organizational factors, such as workload expectations and support structures, can also have a significant impact on teacher productivity (Chapman & Brown, 2016). Productivity in education refers to the efficient and effective use of educational resources to achieve desired educational outcomes. In the context of teaching, productivity relates to the ability of teachers to achieve their teaching goals and objectives in an efficient and effective manner, and is influenced by a range of factors including teacher characteristics, classroom environment, teaching strategies and resources, and organizational factors. The concept of teacher productivity has been increasingly linked to the use of technology in education. Technology can be used as a tool to enhance productivity and efficiency in the classroom, allowing teachers to optimize their teaching strategies and improve student outcomes (Gaudin, 2018). Technology can also assist in reducing administrative workload, such as grading and record-keeping, thereby allowing teachers to focus more on lesson planning and instructional delivery (Starr & Travis, 2018).

2.14 The productivity of teachers as part of human resources in education;

Research has shown that the use of technology can have a positive impact on teacher productivity. For instance, a study by Xu and Jaggars (2013) found that the use of a learning management system (LMS) improved teacher efficiency by reducing administrative workload and enabling teachers to provide more timely feedback to students. Similarly, a study by Tsai and Chai (2012) found that the use of tablet devices in the classroom improved teacher productivity by facilitating more efficient lesson planning and instructional delivery. There are several factors that can impact the productivity of teachers through the use of technology as part of human resources in education. The productivity of teachers is a critical factor in ensuring high-quality education and student achievement. The productive teachers are those who are able to maximize their effectiveness in the classroom, through efficient use of time and resources, and by adopting effective teaching strategies and practices. Here are some factors that can increase the productive of teachers as part of human resources in education. Technology can be used to facilitate collaboration and communication

among teachers, enabling them to share resources and ideas, and learn from one another (Scherer et al., 2017).

2.15 The use of technology;

the use of technology in education have a significant impact on teacher productivity, by providing teachers with access to a range of digital tools and resources that can streamline their work and enhance their effectiveness in the classroom. For example, technology can provide teachers with access to digital resources such as online textbooks, lesson plans, and multimedia content, which can save time and effort in lesson preparation and delivery. Study by Sanyal and colleagues (2012) explored the impact of technology on teacher productivity in K-12 schools, finding that the use of technology tools and resources can help to increase efficiency and save time for teachers. For example, using digital grading tools can help to streamline the grading process and reduce the time and effort required for grading and assessment tasks. In addition, technology can support more personalized and differentiated instruction, allowing teachers to better meet the needs of individual learners. Digital tools such as learning management systems, adaptive learning software, and educational apps can help teachers to track student progress and provide targeted feedback, freeing up time for more individualized instruction and support.

2.16 The availability of resources and support;

A study by Yuen and colleagues (2011) found that using mobile technologies such as smartphones and tablets can help to support individualized learning and increase student engagement and motivation, which in turn can help to improve teacher productivity. One important factor is the availability of resources and support, including access to technology, teaching materials, and professional development opportunities. Technology also help to support differentiated instruction and individualized learning, which can improve student outcomes and support teacher productivity. The successful integration of technology into education requires effective professional development and support for teachers.

Studies have shown that teachers who receive adequate training and support in the use of technology are more likely to effectively integrate it into their teaching practices and experience increased productivity (He et al., 2019; Robinson, 2018).

The effectiveness of technology use in enhancing teacher productivity is contingent upon several factors, including the availability and quality of technology resources, teacher attitudes and beliefs about technology, and the level of support and training provided to teachers (Niederhauser & Stoddart, 2014). Teachers need training and ongoing support to effectively integrate technology into their teaching practice, and to navigate the complexities of digital tools and resources. Teachers who have access to these resources are better equipped to plan and deliver effective instruction, and to provide students with a high-quality learning experience. There must be adequate infrastructure and technical support to ensure that technology is reliable and accessible for all teachers and students. The use of online professional development (PD) has been found to enhance teacher productivity by providing flexible and accessible learning opportunities

2.17 Teacher workload and time management;

The use of online resources, webinars, and online communities of practice can provide teachers with access to up-to-date information and best practices, allowing them to improve their teaching practices and increase their productivity (Ertmer & Ottenbreit-Leftwich, 2010). Another important key factor is teacher workload and time management. Teachers are often responsible for a wide range of tasks and responsibilities, including lesson planning, grading, student assessment, and communication with parents and colleagues. Effective time management skills can help teachers to prioritize tasks, manage their workload more effectively, and maximize their productivity in the classroom this can be achieved with through the use of modern use of technology.

2.18 Effective collaboration and communication among teachers;

Technology can help to support teacher collaboration and communication, which can facilitate the sharing of ideas, resources, and best practices. A study by Warschauer and Matuchniak (2010) found that online communities of practice can be effective in supporting teacher collaboration and knowledge sharing, particularly when they are designed to be user-friendly, flexible, and responsive to teachers' needs. An effective collaboration and communication among teachers can also support teacher productivity, as it allows for the sharing of ideas, resources, and best practices. Collaboration can take many forms, from co-planning and co-teaching to participation

in professional learning communities and peer mentoring programs. The use of technology also facilitates communication and collaboration among teachers, allowing for more efficient sharing of resources and best practices. For example, online discussion forums, social media, and video conferencing can enable teachers to connect with colleagues from around the world, sharing ideas and strategies for improving teaching and learning this also enhances the productivity of teachers. It is important to note that the effective use of technology in education requires a focus on pedagogy and learning outcomes, rather than simply on the tools themselves. A study by Borko and colleagues (2014) found that effective technology integration requires a focus on teaching practices and strategies that are grounded in research and aligned with learning objectives, as well as a focus on ongoing professional development and support for teachers. A research by Gao, Zhang, and Franklin (2013) suggests that technology can also enhance teacher effectiveness by providing opportunities for collaboration and knowledge-sharing among teachers. Through online platforms and social media, teachers can connect with colleagues from around the world, share resources and strategies, and engage in ongoing professional development.

2.19 Teachers' motivation and job satisfaction;

Research has shown that the use of technology can also improve teacher job satisfaction and motivation, leading to higher retention rates and better teacher performance. A study by Huang and colleagues (2018) found that teachers who used technology in their classrooms reported higher levels of job satisfaction and were more motivated to continue teaching.

A study by Lim and Khine (2006) investigated the use of technology in teacher professional development, finding that technology can help to provide teachers with opportunities for self-directed learning, collaboration, and access to new and diverse resources. This can contribute to their professional growth and development, which in turn can improve their productivity and effectiveness in the classroom. Teachers' motivation and job satisfaction are also important factors in teacher productivity. Teachers who feel valued, supported, and recognized for their contributions are more likely to be motivated and engaged in their work, and to provide high-quality instruction and support for their students. Overall, improving the productivity of teachers is critical for ensuring high-quality education and student achievement. This

requires a comprehensive approach that includes providing resources and support, effective time management and workload management strategies, collaboration and communication among teachers, and efforts to promote teacher motivation and job satisfaction. Technology can also support ongoing professional development for teachers, which is critical for maintaining and enhancing their skills and knowledge. A study by Levin and Wadmany (2006) found that online professional development programs can be effective in promoting teacher learning and growth, particularly when they are designed to be interactive, collaborative, and aligned with teachers' interests and needs.

In summary, the use of technology can enhance teacher productivity, motivation and job satisfaction as support for human resource development in education, but it requires a comprehensive approach that includes professional development and support for teachers, as well as adequate infrastructure and technical support.

2.20 To assess and monitor student progress;

The use of digital platforms for grading and assessment can save teachers time and reduce their workload, allowing them to focus on other aspects of teaching (He et al., 2019). Additionally, technology can be used to automate routine tasks such as attendance taking and record keeping, freeing up time for teachers to engage in more meaningful teaching activities (Liao & Chen, 2016).

A Study by Niederhauser and colleagues (2009) examined the impact of technology on teacher planning and preparation, finding that technology tools such as online resources and collaborative tools can help to support more efficient and effective lesson planning and preparation. This can free up time for teachers to focus on other aspects of their work and improve their overall productivity. Technology can also help teachers to assess and monitor student progress more effectively. Online assessments, data analysis tools, and learning analytics can provide teachers with real-time feedback on student performance, allowing them to adjust their instruction and interventions to better meet the needs of individual students. This can not only improve student outcomes but can also save teachers time and effort by automating grading and assessment tasks. Additionally, technology can provide teachers with greater flexibility and autonomy in their work, allowing them to work remotely, collaborate with colleagues in different locations, and customize their teaching approach to meet

the needs of their students. This can help to reduce teacher burnout and increase job satisfaction, contributing to a more sustainable and effective teaching workforce.

Technology can support teacher productivity by automating administrative tasks and providing real-time data and analytics. A study by Hall and colleagues (2018) found that using digital tools for classroom management, such as attendance tracking and behavior monitoring, can help teachers save time and improve the overall classroom environment. However, the integration of technology into education also raises concerns about equity and access.

2.21 Training and effort to integrate technology;

The use of technology in teacher education programs can also contribute to teacher productivity and effectiveness. A study by Goktas and colleagues (2010) found that integrating technology into teacher education programs can help to prepare teachers for the use of technology in their classrooms, improve their digital literacy skills, and enhance their confidence and competence in using technology for teaching and learning. Not all students and teachers have equal access to technology, and some may lack the skills or resources necessary to effectively use digital tools and resources. This can create a "digital divide" that exacerbates existing inequalities in education. Therefore, it is crucial that efforts to integrate technology into education are accompanied by efforts to address issues of equity and access. This may include initiatives to provide technology resources and training to underserved communities, as well as efforts to promote digital literacy and skills development among both teachers and students.

In conclusion, there have been several studies that have explored the impact of technology on teacher productivity in education. One study by Chai, Koh, and Tsai (2010) investigated the use of computer-mediated communication (CMC) in supporting teacher collaboration and professional development. The results indicated that CMC helped to enhance teacher communication and collaboration, which in turn increased their productivity and effectiveness in the classroom. The role of technology in enhancing teacher productivity and supporting human resource development in education is significant, but it requires a comprehensive and equitable approach that addresses the needs of all stakeholders in the education system. With the right investments and strategies in place, technology can help to create a more effective,

efficient, and equitable education system that benefits teachers, students, and society as a whole.

In conclusion, teacher productivity is not just about the use of technology but also involves other factors such as teacher motivation, job satisfaction, and professional development (Ozturk & Cakir, 2018). Teacher motivation and job satisfaction have been found to have a positive impact on teacher productivity. A study by Li and Huang (2017) found that teachers who had high levels of motivation were more productive and effective in the classroom. Professional development opportunities have been found to increase teacher productivity and enhance teaching practices (Ravitz et al., 2017). The integration of technology into teacher professional development has been identified as a way to enhance teacher productivity.

2.22 Factors that impact the productivity of teachers, including workload, professional development, and teacher motivation;

The literature suggests that several factors can impact the productivity of teachers in education, including workload, professional development, and teacher motivation. Studies have shown that teachers who are motivated to perform well tend to have higher levels of productivity (Martin, 2017). Lack of access to professional development opportunities can lead to teacher burnout, dissatisfaction, and decreased productivity (Oluwatayo, 2016). Heavy workloads can lead to stress and burnout, which can in turn negatively affect teacher productivity (Wang & Guo, 2017). Understanding the factors that impact teacher productivity is critical in developing strategies to improve educational outcomes. Adequate workload management, high-quality professional development opportunities, and fostering intrinsic motivation are all factors that can contribute to teacher productivity and effectiveness in the classroom.

The integration of technology in education can also support teacher productivity by providing them with innovative tools and resources to enhance their teaching and engage students in meaningful learning experiences. It is important to address these factors to ensure that teachers are productive and satisfied in their roles, which can lead to improved student outcomes and a more successful educational system.

- **Workload;** has been identified as a significant challenge for teachers, with research indicating that teachers often experience high levels of stress and

burnout due to heavy workloads and competing demands (Skaalvik & Skaalvik, 2017). This can negatively impact teacher productivity and effectiveness in the classroom.

Teachers who have a heavy workload, such as large class sizes, multiple preparations, or numerous administrative duties, may find it challenging to be productive. High workload can lead to stress and burnout, which can result in lower productivity and job satisfaction. Therefore, reducing workload and providing teachers with the necessary resources and support can improve their productivity.

(Harris & Adams, 2007) The workload of teachers is a significant factor that affects their productivity. A heavy workload can lead to burnout, which reduces teacher effectiveness and can have a negative impact on student learning outcomes. (Darling-Hammond, 2017) Studies have shown that teachers who are given adequate time to plan, collaborate with colleagues, and provide feedback to students are more productive and effective in their roles.

- **Professional development;** has been identified as a key factor in enhancing teacher productivity, with research showing that ongoing, high-quality professional development opportunities can improve teacher knowledge and skills, ultimately leading to better student outcomes (Guskey & Yoon, 2009). However, many teachers report feeling dissatisfied with the quality and accessibility of professional development opportunities, highlighting the need for more effective and relevant professional development programs. Teachers who engage in ongoing professional development are more likely to be productive.

Professional development can help teachers stay up-to-date with the latest research and best practices, and provide them with new teaching strategies and techniques to improve student learning. Schools can support professional development by providing opportunities for teachers to attend workshops, conferences, and training sessions. Professional development is another critical factor that impacts teacher productivity.

(Fishman et al., 2013) says Teachers who receive high-quality professional development opportunities are better equipped to implement new teaching strategies and technologies effectively, resulting in improved student outcomes. Professional development programs that are ongoing and provide teachers with opportunities to

collaborate, reflect on their practice, and receive feedback are particularly effective (Guskey & Yoon, 2009).

- **Teacher motivation:** Teacher motivation is essential for productivity, with research indicating that motivated teachers are more likely to engage in effective teaching practices and experience greater job satisfaction (Deci & Ryan, 2008). Teachers who are motivated are more likely to engage in effective teaching practices, seek out professional development, and go above and beyond in their teaching duties. Therefore, it is essential to understand the factors that motivate teachers, such as recognition, job satisfaction, and opportunities for advancement, and to provide these incentives to support teacher motivation and productivity. Teacher motivation is also a crucial factor that impacts their productivity. Studies have shown that teachers who are intrinsically motivated, meaning they are motivated by a desire to learn, grow, and make a difference in their students' lives, are more productive and effective in their roles (Ryan & Deci, 2000). External motivators such as rewards and sanctions are less effective in promoting teacher productivity and can lead to a reduction in intrinsic motivation (Pink, 2009). Teacher motivation can be impacted by a range of factors, including working conditions, administrative support, and the level of autonomy and control teachers have over their work.

2.23 Examination of the different approaches and strategies used to improve teacher productivity;

Various approaches and strategies have been employed to improve teacher productivity. One of the most effective strategies is providing opportunities for professional development. This could include attending workshops, seminars, and conferences to learn new teaching techniques, technologies, and strategies. According to research by Darling-Hammond and Richardson (2009), professional development programs have a significant impact on teacher productivity, and they have been shown to improve teaching practices and student learning outcomes.

Another approach to improving teacher productivity is through the use of incentives and recognition programs. Research has shown that incentivizing and recognizing teachers for their hard work and dedication can increase their motivation and

productivity (García-Martí and García-Sánchez, 2018). Incentives can include bonuses, promotions, and other forms of recognition.

Another approach is reducing the workload of teachers can also increase their productivity. This can be achieved through various means such as reducing class sizes, providing support staff, and reducing non-teaching responsibilities. According to a study by the National Education Association (NEA) (2012), reducing class sizes can significantly improve teacher productivity, as it allows them to provide more individualized attention to their students and reduces the amount of time spent on classroom management.

In addition, teacher motivation has been found to be a key factor in improving productivity. When teachers feel motivated and engaged in their work, they are more likely to be productive (Deci & Ryan, 2000). To improve motivation, schools can provide opportunities for teachers to take on leadership roles, recognize and reward their accomplishments, and create a positive and supportive work environment.

Finally, technology can also be used as a strategy to improve teacher productivity. As discussed in this Chapter, technology can provide teachers with access to digital resources, interactive tools, and online learning management systems that can simplify administrative tasks, facilitate communication, and enhance student engagement. The use of technology in education has been shown to increase teacher productivity and improve student outcomes (Hodges et al., 2020). A combination of these approaches and strategies can be effective in improving teacher productivity. By providing professional development opportunities, reducing workloads, and promoting teacher motivation, schools can create a supportive and productive environment for their teachers.

CHAPTER III

METHODOLOGY

This chapter outlines the research methodology employed to investigate "the role of technology in enhancing the productivity of teachers as part of human resources development in education". The study employed a qualitative research method to explore the role of technology on the productivity of teachers as part of human resources development in education. The study embraced a qualitative research approach, which is well-suited for exploring complex and subjective phenomena, including human behavior, experiences, and perceptions (Creswell, 2014). Therefore, this chapter presents a synopsis of the research methodology utilized to delve into this topic.

The methodology encompasses various key components, including the study's structure, the scope of the study, the study participants, the tools utilized for data collection, the data gathering process, and the procedures for data analysis. Additionally, it involves considerations of validity and reliability, ethical considerations, and the role of the researcher.

The researcher employed a qualitative research approach due to its ability to utilize methods such as participant observations or case studies, which yield a narrative and descriptive account of a practice or setting (Parkinson & Drislane, 2011). By adopting a qualitative approach, the study aimed to capture the intricate details and contextual subtleties of the phenomenon under investigation.

The universe of this research consists of twenty-five [25] teachers' participants, five [5] of each teacher from each five [5] selected secondary schools in Nigeria. This research used qualitative research method. This research will take into consideration the views and thoughts of all the participants in order to acquire a deeper insight into the topic being researched.

This study is grounded on a survey. Similarly, this research uses qualitative research technique to get participants views on the subject matter. Open-ended questions with a semi-structured format were employed in this study, and the participants willingly consented to respond to these inquiries.

Data was collected from Five [5] secondary schools in Nigeria, five [5] of each qualified teacher of each secondary school using digital platforms such as google forms, WhatsApp and google meet. The views of the teachers were collected through 12 questions which were divided into two parts. Section-A which was the demography and Section-B of the study consisted of a sample comprising twenty-five [25] certified and qualified teachers. This sample was selected to include five [5] teachers from each school. It is crucial to note that all the participants who participated in this research did so voluntarily and will remain anonymous.

3.1 Research Design

The study employed a case study methodology, which is a suitable approach when exploring real-life situations and phenomena (Yin, 2014). The utilization of the case study approach allowed the researcher to acquire a comprehensive and profound comprehension of the role of technology on the productivity of teachers within a specific context.

The research design adopted in this study is the qualitative data methodology, comprising narrative, descriptive interviews, as well as the collection and analysis of data.

The qualitative data was collected through focus group discussions and interviews conducted with teachers from each of the selected secondary schools in Nigeria. Both primary and secondary data were employed to address the research objectives, providing a comprehensive understanding of the research issues at hand and allowing for data triangulation, which increases the credibility and validity of the findings. Books, journals, publications, research papers, articles, and websites that were readily available were used to gather secondary data. Primary data was gathered using an open-ended structured questionnaire.

There are two sections to the questionnaire. The demographic composition of the respondents is examined in Section A, and “The Role of Technology on the Productivity of Teachers as Part of Human Resources Development in Education is Examined in Section B.

3.2 Population of the research

The study utilized purposive sampling to select the participants. Purposive sampling is an appropriate sampling method in qualitative research, which involves selecting participants based on their ability to provide relevant information related to the research inquiry (Creswell, 2014).

The participants of this research consists of twenty-five [25] teachers, five [5] of each teacher from each five [5] selected secondary schools in Nigeria.

The study's sample comprises of twenty-five [25] certified and qualified teachers, five [5] teachers from each schools. It is pertinent to highlight that the participation of all individuals in this research will be voluntary and anonymous.

3.3 The study group

The focus group that will be interviewed in this research study are mainly the certified and qualified teachers of the various selected secondary schools in Nigeria.
The research sample size in this context is 25 participants. The researcher distributed forms to all 25 participants and received responses from each one, representing 100% of the population and participants. All individuals willingly provided their consent to be part of the research group. The respondents were selected from 5 secondary schools in Nigeria, with 5 teachers chosen from each school, resulting in a total of 25 participants.

3.4 Data Collection Tools

The study utilized thematic analysis to examine the collected data. Thematic analysis or coding is a technique employed to discern recurring patterns and themes within qualitative data (Braun & Clarke, 2012).

The data gathering techniques for this study involve surveys, focus group discussions, and interviews. Qualitative research method was employed to gather data through a structured interview. Information was collected through a structured interview process as part of the qualitative research approach, utilizing twelve [12] predetermined questions to gather comprehensive insights from the 25 participants in each selected school.

The participants engaged in the interview through the digital platform, utilizing tools such as Google Forms, WhatsApp, and Google Meet. Substantial information was gathered from the 25 participants in each selected school.

A qualitative methodology is employed to collect and analyze the data. The formulated questions are aligned with the research topic to obtain accurate information that supports the hypothesis and subsequent analysis.

3.5 DATA COLLECTION PROCESS

Twenty-five [25] participants chosen for this research are highly qualified and knowledgeable teachers from each selected secondary school in Nigeria.

A pre-determined interview questionnaire was utilized to collect essential data that is aligned with the aforementioned research.

The interviews were conducted via the digital platform utilizing tools such as Google Forms, WhatsApp, and Google Meet which is video conference form. Every question in the interview was carefully selected and chosen and will be analyzed by the participants based on their sincere opinions and answers to address the formulated hypothesis.

3.6 Procedure for Data Collection;

After obtaining ethical approval from the committee, the participants were provided with a participant information and consent form via email and WhatsApp. Once their consent was received, the research form and questionnaire were shared with them through Google Forms, and an interview was scheduled using Google Meet. The questionnaire comprised two sections: demographics and open-ended questions, allowing participants to express their honest opinions. As this study follows a qualitative research approach, the researcher categorized participants with similar views into groups and calculated their percentage out of 100% to analyze the data.

3.7 RESEARCHER'S ROLE

The researcher acts as the bridge between the participants and the data being gathered. The researcher's responsibility is to maintain the confidentiality and anonymity of the participants' information. The researcher's role involves methodically collecting

comprehensive data and deciphering the underlying hypothesis being gathered. The researcher's role entails safeguarding the confidentiality and anonymity of the participants' information.

3.8 VALIDITY AND RELIABILITY

Per Burns and Grove (2001), validity refers to the extent to which the data obtained through the research instrument accurately represents the truth. Validity can be categorized into internal and external validity, which assess the accuracy of the measuring instrument in capturing the intended information.

The data collected from the aforementioned 25 participants was obtained from reliable sources and deemed valid. The recruitment of participants was not random but based on their proficiency and qualifications in their respective field of work. Each response provided by the participants was carefully scrutinized to ensure the avoidance of any misconceptions.

3.9 Procedure for Data Analysis

The data obtained from the five [5] secondary schools in Nigeria was examined using descriptive statistics and inferential statistics. Descriptive statistics were employed to summarize the demographic information, the utilization of technology in the classroom, and teachers' productivity.

Inferential statistics were employed to examine the correlation or association between the use of technology in the classroom and teacher productivity.

The data collection also focused on qualified teachers of each secondary schools. Five [5] qualified teachers from each secondary schools making up 25 teachers who were participants, and all the intended information were gotten 100% as these were recorded. The research study did not consider gender disparity. Qualified Teachers of each secondary school from age 18-60years old where considered and 5 from each secondary where selected on self-voluntary to participate for this research.

3.10 Ethical Consideration

The researcher used several ethical considerations. The study followed ethical guidelines to ensure that participants' rights were protected and each participant were kept anonymous.

Explicit consent was obtained from all participants, and confidentiality was maintained throughout the study all information given by respondents were handled with care and used for this research purposes only. The participants were made aware of their option to voluntarily discontinue their involvement in the study at any stage without facing adverse repercussions or any negative consequences. The data collected was kept secure and anonymous to protect the participants' privacy.

An application was forwarded to the ethical committee of Near East University, and the researcher received the approval of the ethical committee to conduct this research.

3.11 Brief Profile of the Participants

The twenty-five teachers who were used for the collection of this research primary data were from 5 different secondary schools in Nigeria. This contains information about the gender and age range of participant.

Gender	**%**	**f**
Female	52	13
Male	48	12
Total;	**100**	**25**
Age;	**%**	**f**
18-25	none	none
26-30	40	10
31-35	48	12
36-40	none	none
41-45	4	1

46-50	4	1
50 and above	4	1
Total;	**100**	**25**

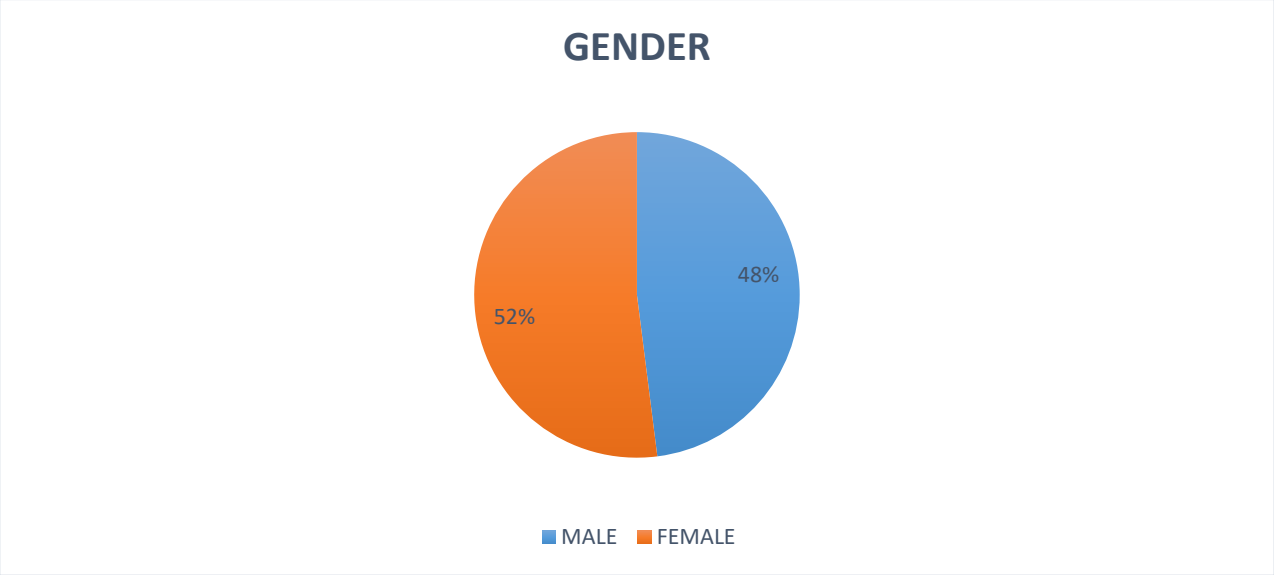
CHAPTER IV

Findings and Discussion

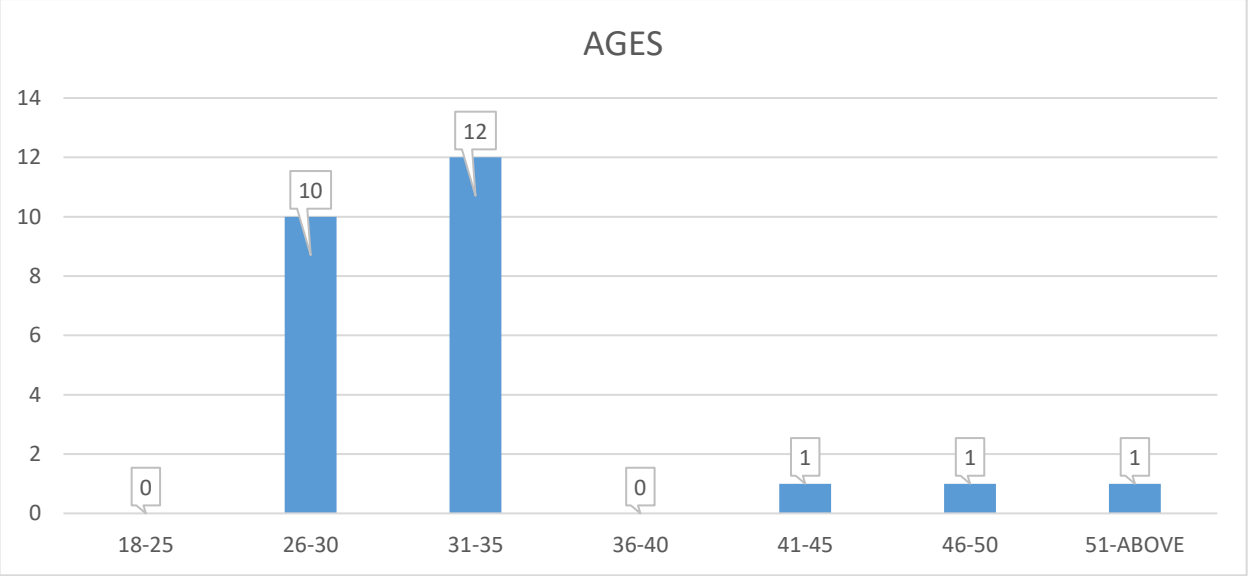
The research data was obtained through a semi-structured interview process. A semi-structured interview aims to elicit individual perspectives from individuals regarding a particular observed scenario or event. The semi-structured interview was carried out with a group of twenty-five lecturers. It utilizes a moderately comprehensive interview guide or framework and is useful in situations where objective knowledge is sufficient but subjective knowledge or personal view points is limited (Merton & Kendall, 1946; Morse & Field, 1995; Richards & Morse, 2007).

The information about the twenty-five [25] teachers is provided in the first table. The researcher went through the data several times so as the fully understand the responses of the participants. The interviews listened to and compared with other data. The result of all the data that was collected for this research will be scrutinize in this section. The researcher used direct quotes from the participants to ensure that the information provided in this section is accurate. These quotes are written in italics and labeled from L1 to L25.

Figure 1 Demographic Variables



This diagram shows; the percentage and frequency of the genders, male and female teachers who participated in this research study. It shows that 13[52%] of the teachers where females participates and 12[48%] of this teachers where male participates.



This diagram explains; the age range of the participants and how many people within each age range participated from age 18-age 50-above.

From age 18-25 we had none participate. From age 26-30 we got 10 participates. From age 31-35 there were 12 participates. From age 36-40 we had none participate. From age 41-45 we had 1 participate. From age 46-50 we had 1 participate within that age

range. Lastly from age 51- above, we had 1 participant. All participants total to twenty-five [25] numbers of teachers within this age brackets who participated in this research study.

Table 1 Participants Opinion on the role of Technology in helping teachers teach students in terms of learning and teaching process

Role of technology in helping teachers teach students in terms of learning and teaching process		
	F	*%*
Student engagement and connectivity	7	14
Help teachers improve efficiency and productivity	7	14
Time management and reduce work load	7	14
Personalized learning and student motivation	6	12
Facilitate collaboration and communication	6	12
Access to information and blend global learning	6	12
Improve learning experience and student performance	6	12
Preparation of lesson plan, grading and feedback	5	10
Total	50	100

The table above shows the participant opinion on the role of Technology in helping teachers teach students in terms of learning and teaching process.

7[14%] said," technology promotes student engagement and connectivity. One wrote "Technology is instrumental in teaching and learning today as it connects students, creates interactive learning, manages time in learning, gives students and teachers real time feedback and improves decision making". Another said "Enhancing students' engagement, provide access to information, personalized learning, collaboration and communication". 7[14%] said, it Helps teachers improve efficiency and productivity.

7[14%] said, Time management and reduce work load. One said "many teachers use interactive software and programs as learning, so that students can respond to questions and lectures digitally". Another said "Technology has made teaching easier as notes can be shared to students online beforehand saving teachers time to focus on explanations in class instead of note takings and reducing the load of notebooks on students". Another said "It helps reduce teachers work load".

6[12%] said personalized learning and student motivation. One said ‘Personalized learning; with the help of technology teachers can tailor the learning of their students’ experience to meet the individual needs of each student”. Another wrote “Enhancing students’ engagement, provide access to information, personalized learning, collaboration and communication”.

6[12%] said Facilitate collaboration and communication “Facilitating collaboration and communication among teachers and their students and other teachers all over the world”.

6[12%} Access to information and blend global learning. 6[12%] said Improve learning experience and student performance. “Digital skills and creative thinking for students”.

5[10%] Preparation of lesson plan, grading and feedback. One said “The use of digital learning tools in classrooms can increase student's engagement, help teachers prepare their lesson plans, and improve student's performance”. “Increasing efficiency and productivity: technology helps teachers streamline administrative tasks such as grading and recording keeping, freeing up more time for teaching and interacting with students”.

Table 2 Participant’s opinion on how the think the roles of teachers has changed with the use of technology in their classrooms.

How the role of teachers has changed with the use of technology in classrooms		
	f	*%*
Easier to access data, information, manage information, student progress, and feedbacks.	14	25
Expanded the roles of teachers beyond traditional lecturing and delivering information	7	12.5
Limit time and Time management	7	12.5
Helps in the Implementation of variety of teaching methods and enhance teaching and learning process	6	11

Teachers role have become more relax, reduce work load and increasingly productive	6	11
Effective and efficient communication between teachers and student and teacher and parent	5	9
Facilators and guides for student learning	5	9
Efficiency in creating lesson plans and grading assignment	4	7
Effective learning experience and collaboration	2	4
Total	56	100

The table above shows the participants point of view on how they think the role of teachers has change with the use of technology in their classrooms.

14{25%} of the participant responded by saying technology makes it easier to access data, information, manage information, student progress and feedbacks. One said "The use of technology has made it easier for us teachers to access and manage information, such as student progress, asses to data and feedbacks. Another wrote "Technology have also helped us teachers to have access to students' progress and management of data and learning information". Another wrote" The use of technology has made it easier for us teachers to access and manage information, such as student progress, asses to data and feedbacks". Another said "Technology have made it easier for teachers to access and manage information, such as student progress and assessment of data". Another wrote "It helps teachers to identify areas of improvement and provides personalized feedback to their students".

7[12.5%] said, it expanded the role of teachers beyond traditional lecturing and delivering information. One wrote" Technology have expanded the roles of teachers beyond traditional lecturing and delivering information to become facilitators and guides for students learning". Another answered "The role of teachers has gone beyond traditional lecturing and teaching, technology have helped to deliver information to become facilitators and guides for students learning, also enabling them to be more efficient and effective in their work in the classrooms".

7[12/5%] said it limit time and time management. One participant wrote “In the aspect of writing on the board, teachers spend less time thereby having more time for explanations”. Another said “The bulky job of the teacher has been reduced due to the fact that the do not only have time to explain but the use of websites has helped to reduce their assignments”. Another wrote “Teachers especially in higher institutions now just need to give a course outline to students and allow them make research on their own, It has reduced the time spent explaining concepts, So teachers have become more like supervisors”.

6[11%] said it has helps in the Implementation of variety of teaching methods and enhance teaching and learning process. One wrote “it has helped in the Implementation of variety of teaching methods like the use of multimedia tools, interactive white board etc.”

6[11%] said that, Teachers role have become more relax, reduce work load and increasingly productive. One wrote “With the use of technology, teachers’ role has become more relaxed and increasingly productive in limited time”. Another said “It has enhanced teaching and learning process through the use of different teaching and learning methods”.

5[9%] said, it has promoted an impactful and proficient communication between teachers and students, and teacher and parent. One said “the use of technology has increased the effectiveness in communication”. Another said “It has promoted, facilitated and streamline effective and efficient communication between teachers and students, among teachers and parents, and among student themselves”.

5[9] said, it has become facilitators and guides for student learning. One wrote “it has become a guidance for student in learning”.

4[7%] said, it efficiency in creating lesson plans and for grading assignments. A participant said “it has Increase productivity and efficiency in creating lesson plans and grading assignment”. Another wrote “Creating lesson plans and grading assignments technology is very useful”

2[4%] said, Effective learning experience and collaboration. One said “Technology have helped teachers to collaborate with each other more”. Another r said “Effective and efficient learning”.

Table 3 As a teacher, how technology in education motivates students to get more involved in learning activities

How technology in education motivates students to get more involved in learning activities		
	F	*%*
Personalized learning tools and new opportunities for student learning	17	32.7
Students motivation, increase students interest and engagement in learning	13	25
Collaboration and communication	8	15.4
Provide interactive engaging learning experience and fun active learning	5	9.6
Academic performance and feedback	5	9.6
Availability of online resources and educational apps	4	7.7
Total	52	100

This table shows the participants view as teachers, how technology in education motivates students to get more involved in learning activities.
17[32.7] said, Personalized learning tools and new opportunities for student learning. 13[25%] said Students' motivation, increase students interest and engagement in learning. 8[15.5%] said, Collaboration and communication. 5[9.6%] said, Provide interactive engaging learning experience and fun active learning. 5[9.6%] said, Academic performance and feedback. 4[7.7%] said, availability of online resources and educational apps.

Here are some of the writings from participants. One wrote, "As technology continues to play increasingly important role in education, students need to be equipped with the skills and knowledge to use technology effectively. Teachers having knowledge and skills in technology will help prepare their students for the future". Another wrote "Technology has really helped students. Especially the vast availability of resources online that is readily available to the students literarily at their fingertips. Also the use of projectors has made it easier to show concepts in pictures and video". Another said "It has provided opportunities for collaboration and communication, which has increased students' engagement and motivation e.g.: students can work together on

projects using online tools and communication with each other and their teacher through messaging apps or video conferencing". "Through the use of management systems, these systems have helped create manage and deliver learning materials to students online and offline which has helped them to be more involved in learning". Another wrote "Technology have made education fun for students, with the use of educational apps, and software. Technology have helped teachers to satay up to date with development and new learnings and opportunities to improve their students with best possible learning experience to prepare them for the future". "Technology have made education fun for students, with the use of educational apps, and software. Another said "Technology have helped teachers to satay up to date with development and new learnings opportunities to improve their students with best possible learning experience to prepare them for the future".

Table 4 What kind of improved technology teachers need or can use to stimulate the effective learning and motivation of their students?

Kinds of improved technology teachers need or can use to stimulate the effective learning and motivation of their students		
	f	*%*
Learning apps like education apps and gamification apps	13	26
Learning management tools, canvas, video conferencing tools, lesson planning, multimedia materials, google meet	6	12
Interactive whiteboards, Projectors of classrooms, dreambox, razkids, nearbox, reading A-Z, flipgrip	6	12
Open learning, personal learning, global materials, and method of learning	5	10
Augmented virtual reality used to explore historical sites	5	10
Some popular LMSES used by education institution, popular enterprises-level LMSES, adobe captivate prime, deocebo LMS, talents MS, spring learn and efront	4	8

User friendly technology digital stimulation and models	4	8
Collaborative space, interactive management for student progress through feedback	4	8
Augmented reality [AR] robots that foster collaboration and inquisitiveness	3	6
Total	50	100

The table above shows the participant's point of view on Kinds of improved technology teachers need or can use to stimulate the effective learning and motivation of their students.

13[26%] said, Learning apps like education apps and gamification apps. 6[12%] said, Learning management tools like canvas, video conferencing tools, lesson planning, multimedia materials, google meet. 6[12%] said, Interactive whiteboards, Projectors of classrooms, dreambox, razkids, nearbox, reading A-Z, flipgrip. One said, the utilization of virtual classrooms, video, augmented reality (AR), robots, and other technological tools not only adds vibrancy to the learning experience but also cultivates inclusive learning environments that encourage collaboration, curiosity, and empower teachers to gather valuable student performance data. Another said, investing in advanced technologies like Dream box, Razkids, Nearbox, Reading A-z, augmented reality tools like Flipgrid would make things easier. Another wrote, to simulate and effective learning and motivated students I think learning apps: like Educational apps, Gamification tools for secondary schools should be invested in for our school. 5[10%] said, Open learning, personal learning, global materials, and method of learning. 5[10%] said, Augmented virtual reality used to explore historical sites. 4[8%] said, some popular LMSES used by education institution, popular enterprises-level LMSES, adobe captivate prime, deocebo LMS, talents MS, spring learn and efront. 4[8%] User friendly technology digital stimulation and models. 4[8%] Collaborative space, interactive management for student progress through feedback. 3[6%] Augmented reality [AR] robots that foster collaboration and inquisitiveness. Total of 50 frequencies and 100%.

Table 5 Why is it importance for teachers to have knowledge on the use of technology in digital classroom?

Why is important for teachers to have knowledge on the use of technology		
	f	*%*
Collaboration and communication	8	21.1
Technology has become a necessity in today's digital age, teachers needs to be able to use it effectively to support students learning	5	13.2
Increase student interest, motivation and engagement in education	5	13.2
Technology has become an increasing importance part of modern education enhances the teaching and learning experience in every classroom	4	10.5
Provide interactive engaging learning experience for students in different learning styles and preference	4	10.5
Teachers can better integrate technology into their lesson, important part modern education and problem solving	4	10.5
Technology is constantly evolving teachers need to keep up with the latest development and necessary skill	3	7.9
Reduce work load and enhance work more efficient and effective	3	7.9
Time management	2	5.2
Total	38	100

This table shows participant point of view on why is important for teachers to have knowledge and learn on the use of technology.

8[21.1%] said, Collaboration and communication. One wrote, Technology has played a pivotal role in fostering the advancement of communication skills between teachers and students, it is important for teachers to learn and have good knowledge on the use

of technology in their classrooms. 5[13.2%] said Technology has become a necessity in today's digital age, teachers needs to be able to use it effectively to support students learning. 5[13.2%] said Increase student interest, motivation and engagement in education. 5[13.2%] Increase student interest, motivation and engagement in education. 4[10.5%] another wrote, Technology has emerged as an increasingly vital component of modern education enhances the teaching and learning experience in every classroom. 4[10.5%] wrote, Provide interactive engaging learning experience for students in different learning styles and preference. 4[10.5%] said, Teachers can better integrate technology into their lesson, important part modern education and problem solving.

3[7.9%] said, Technology is constantly evolving teachers need to keep up with the latest development and necessary skill. 3[7.9%] wrote, reduce work load and enhance work more efficient and effective .2[5.2%] said, Time management. Total of 38 frequencies and 100%.

Table 6 How does the integration of technology benefit the learning of students?

How the integration of technology benefit the learning of students		
	f	*%*
Enhance students interest in learning and motivation	7	23.33
More engaging learning and interactive education	5	16.67
Boast collaboration and communication	5	16.67
Enables student to be creative and think critically	4	13.33
Access educational materials and multimedia tools and contents	4	13.33
Enable learning beyond traditional classroom with the use of internet and digital resources	3	10
Provide personalized learning experience	2	6.67
Total	30	100

This table shows participant's point of view on how the integration of technology benefit the learning of student. 7[23.33%] said, it enhances students interest in learning and motivation. 5[16.67%] wrote, it enhances more engaging learning and interactive education. 5[16.67%] said, Boast collaboration and communication. 4[13.33%] said, enables student to be creative and think critically. 4[13.33%] said, Access educational materials and multimedia tools and contents. 3[10%] wrote, enable learning beyond traditional classroom with the use of internet and digital resources. 2[6.67%] said, Provide personalized learning experience. Total of 30 frequencies and 100 percent.

Table 7 How does the integration of technology effect the learning of students?

How the integration of technology effect the learning of student		
	f	*%*
distraction for students in learning	7	35
leads to lack of face to face interaction and socialization	5	25
increases screen time	5	25
lack of training and professional development	3	15
Total	20	100

This table explains participant's point of view on how the integration of technology effect the learning of student.

7[35%] wrote, distraction for students in learning. 5[25%] wrote, leads to lack of face to face interaction and socialization. 5[25%] said, increases screen time. 3[15%] lack of training and professional development. Total I got 20 frequencies and 100% for this table.

Table 8 How do you think the implementation and improvement of technology will enhance the teacher's productivity in education?

How the implementation and improvement of technology will enhance the teachers productivity in education		
	f	%
Reduce administrative tasks and work load	9	22.5

Provide teachers with access to wealth of instructional material	7	17.5
Preparation and implementation of lesson plans	5	12.5
Improve labor and productivity	5	12.5
Help in connection with other educators and collaboration among teachers	5	12.5
Performance and time management	5	12.5
Facilitate communication and collaboration	4	10
Total	40	100

This table explains participant's point of view on how the implementation and improvement of technology will enhance the teachers' productivity in education.

9[22.2%] said, Reduce administrative tasks and work load. 7[17.5%] wrote, Provide teachers with access to wealth of instructional material. 5[12.5%] said, Preparation and implementation of lesson plans. 5[12.5%] wrote, Improve labor and productivity. 5[12.5%] wrote, Help in connection with other educators and collaboration among teachers. 5[12.5%] wrote, Performance and time management. 4[10%] said, Facilitate communication and collaboration. Total is 40 frequencies and 100 percent.

Table 9 Is there any management system put in place on the use of technology for teacher's productivity?

Management systems put in place on the use of technology for teacher's productivity		
	f	*%*
Google, classroom, models, projectors, canvas, SC horology	12	20
Some learning management system for teachers learning, good learning environment and classroom	10	16.7
Yes	8	13.3

Yes, classroom, blackboard which some need improvement and up to date development	5	8.3
New and updated management system should be put in places	5	8.3
Workshops, online resources and professional development opportunities	5	8.3
Digital classroom apps and online learning	5	8.3
Microsoft team, online lesson plan thou some needs improvement	5	8.3
Latest educational technologies and strategies	3	5
No	2	3.3
Total	60	100

This table shows participants point of view on Management system put in place on the use of technology for teacher's productivity.

12[20%] said, Management system put in place on the use of technology for teacher's productivity.

Google, classroom, models, projectors, canvas, SC horology. 10[16.7%] said, some learning management system for teachers learning, good learning environment and classroom. 8[13.3%] said, yes. 5[8.3%] said, Yes, classroom, blackboard which some need improvement and up to date development. 5[8.3%] said, New and updated management system should be put in places. 5[8.3%] said, Workshops, online resources and professional development opportunities. 5[8.3%] Digital classroom apps and online learning. 5[8.3%] said, Microsoft team, online lesson plans thou some needs improvement. 3[5%] latest educational technologies and strategies. 2[3.3%] said, No. total frequency 60 and 100 percent.

Table 10 Given that the use of technology is applied in school, how have it promoted the development of communication skills between the teachers and students

How the use of technology have promoted the development of communication skills between the teachers and students		
	f	%
24hrs Communication between student and teachers has been improved, WhatsApp group, video conferencing tools, Email medium, virtual meetings.	16	32
Collaborations tools and interaction between teachers and student both in the classroom and outside classroom	11	22
Peer to pear interactions using digital platforms and online socialization	7	14
It has provided feedbacks on assignments	6	12
It has improved quality teachings and learning aids exposed through technology	3	6
Teachers use online discussion boards, blogs and other collaborative tools to promote group discussions and team work	3	6
It promotes parent and teachers relationship for improvement of the child	2	4
It has open new opportunity in teaching and learning	2	4
Total	50	100

This table shows participant's point of view on how the use of technology have promoted the development of communication skills between the teachers and students.

16[32%] said, 24hrs Communication between student and teachers has been improved, WhatsApp group, video conferencing tools, Email medium, virtual meetings. 11[22%] Collaborations tools and interaction between teachers and student both in the classroom and outside classroom. 7[14%] Peer to pear interactions using digital

platforms and online socialization. 6[12%] It has provided feedbacks on assignments. 3[6%] said, it has improved quality teachings and learning aids exposed through technology. 3[6%] said, Teachers use online discussion boards, blogs and other collaborative tools to promote group discussions and team work. 2[4%] wrote, it promotes parent and teachers' relationship for improvement of the child. 2[4%] said, it has open new opportunity in teaching and learning. Total of 50 frequencies and 100 percent.

Table 11 How has the use of technology increase academic achievement?

How the use of technology increase academic achievement		
	F	*%*
Enhance student high other thinking, skill development, research skill, digital skill, and intellectual capacities	12	24
It has shown positive impacts and increase students learning experience	7	14
Personalized learning	7	14
It has Provided access to lots of educational resources, educational software and digital tool	6	12
Engage collaboration and problem-solving activities and discussion	5	10
Access to multiple source and online resources	5	10
Peer to peer interaction and learning	3	6
Enhance communication	3	6
Save time for teachers	2	4
Total	50	100

This table shows participants view on how the use of technology increase academic achievement.

12[24%] said, Enhance student high other thinking, skill development, research skill, digital skill, and intellectual capacities. 7[14%] wrote, it has shown positive impacts

and increase students learning experience. 7[14%] said, Personalized learning. 7[14%] wrote, it has provided access to lots of educational resources, educational software and digital tool. 5[10%] wrote, Engage collaboration and problem-solving activities and discussion. 5[10%] said, Access to multiple source and online resources. 3[6%] said, Peer to peer interaction and learning. 3[6%] said, Enhance communication. 2[4%] said, Save time for teachers. Total 50 frequencies and 100 degrees.

Table 12 As a teacher, do you think the use of technology eases the pressure on a teacher in what teams?

As a teacher, the use of technology eases the pressure on a teacher		
	f	*%*
Reduce and manage work load	10	20
Provide resources to automate routine task such as grading, record keeping	8	16
Provide new opportunities to teachers and collaboration	7	14
Reduce administrative task such as lesson notes, preparation of results	7	14
The use of digital tools, video conferencing and screen sharing facilities for professional development	5	10
Open education resources and access to wide range of teaching resources and materials	5	10
Provides personal learning for students to ease pressure on teachers	5	10
Increase student engagement, motivation and achievements and immediate feedback	3	6
Total	50	100

This table shows the participants' point of view as a teacher, the use of technology eases the pressure on a teacher.

10[20%] wrote, Reduce and manage work load. 8[16%] said, provide resources to automate routine task such as grading, record keeping. 7[14%] said, Provide new opportunities to teachers and collaboration. 7[14%] wrote, Reduce administrative task

such as lesson notes, preparation of results. 5[10%] said, the use of digital tools, video conferencing and screen sharing facilities for professional development.

5[10%] wrote, Open education resources and access to wide range of teaching resources and materials. 5[10%] said, provides personal learning for students to ease pressure on teachers. 3[6%] said, Increase student engagement, motivation and achievements and immediate feedback. Total 50 frequencies and 100 degrees.

Table 13 As a teacher what do you think are the challenges or problems to look at to improve technology used by teachers in schools?

The challenges or problems to look at to improve technology used by teachers in schools		
	F	*%*
Lack or limited asses to technology and equipment for both teachers and students	10	20
Lack of proper training on the use of technology	8	16
Technical issues and malfunction which can disrupt classroom learning	7	14
Cost of technology and budget constraints	7	14
Teachers resistance to change and prefer traditional teaching methods	5	10
Provision of constant electricity, internet and WIFI	3	6
Cyber security risk	3	6
The ability to use technology easily and legal policy issues	3	6
Environmental factors and schooling environment	2	4
Student distraction	2	4
Total	50	100

This table shows the participants view on the challenges or problems to look at to improve technology used by teachers in schools.

10[20%] Lack or limited asses to technology and equipment for both teachers and students.

10[20%] said, Lack or limited asses to technology and equipment for both teachers and students. 8[16%] said, Lack of proper training on the use of technology. 7[14%] Technical issues and malfunction which can disrupt classroom learning. 7[14%] said, Cost of technology and budget constraints. 5[10%] said, Teachers' resistance to change and prefer traditional teaching methods. 3[6%] wrote, Provision of constant electricity, internet and WIFI. 3[6%] wrote, Cyber security risk. 3[6%] said, the ability to use technology easily and legal policy issues. 2[4%] said, Environmental factors and schooling environment. 2[4%] said, Student distraction. Total 50 frequencies and 100 degrees.

CHAPTER V

Discussion of Findings

5.1 Overview

This chapter [Chapter 5] report typically discusses the findings of the study, analyzing and interpreting the data collected through the research methodology described **in Chapter 3.** It also involves a critical analysis of the results, comparing them to the existing literature and theories discussed **in Chapter 2**. The discussion of findings aims to answer the research questions that were posed in the introduction of the study as well as limitations **in Chapter 1**. Overall, the discussion of findings serves as the main body of the research study. **Chapter 5** serves as the core of the research report, presenting the main results and interpretations of the study. This will help to provide a deeper understanding of the role of technology in education and how it can be used to improve the productivity of teachers.

5.2 General Summary of the Study;

In the context of the topic "The Use of Technology and Teachers' Productivity as Part of Human Resource Development in Education," the discussion of findings would focus on the impact of technology on teachers' productivity and how it relates to human resource development in education.

A study by Huang and colleagues (2018) found that teachers who used technology in their classrooms reported higher levels of job satisfaction and were more motivated to continue teaching. A study by Saba and Shearer [2014] examined the impact of technology-supported instruction on teacher workload and job satisfaction. Particularly when it is used to automate administrative tasks and provide teachers with more time for lesson planning and professional development. Technology also serves as a tool used to support teacher professional development, by providing opportunities for online learning and collaboration, access to resources and professional networks, and tools for assessment and evaluation. This study finds that teachers who received more training on using technology in the classroom reported higher levels of productivity and job satisfaction compared to those who did not receive such training.

In Chapter 2, the literature review highlighted the various factors that impact the productivity of teachers, including workload, professional development, and teacher motivation. The use of technology was also identified as a potential solution to improving teacher productivity in education.

According to a study by Alshurideh and Alquraan (2020), the incorporation of technology in education has led to increased student engagement and motivation, improved teacher productivity, and enhanced learning outcomes. Technology should be used to complement the functions of the teacher in the classroom and not replace it. A study conducted by Tondeur et al. (2018) revealed that although most teachers incorporate technology in their teaching, there are notable variations in the extent of integration and the quality of its utilization. The research will contribute to the implementation, training, and professional development of teachers in utilizing technology as an integral component of human resources.

Another research has shown that technology tools like learning management systems and gradebook software can help teachers save time and improve the accuracy and efficiency of their administrative tasks (Bowers & Christensen, 2018; Means et al., 2010). Conceptual framework development begins with a logical presupposition that an issue is present, and strategies, tactics, methodologies, or models, may be used to resolve the issue, (Zackoff et al., 2019). Another area of focus will be the use of technology to enhance communication between teachers and students, such as through online discussion forums and video conferencing tools. These tools can help teachers to better understand student needs and provide more personalized support, while also facilitating more frequent and efficient communication between teachers and students (Dabbagh & Kitsantas, 2020).

In Chapter 3 the qualitative research conducted indicate that the use of technology can have a significant positive impact on teacher productivity. Teachers reported that technology tools such as learning management systems, online collaboration platforms, and digital resources helped to streamline administrative tasks, provide access to more effective teaching resources, and facilitate communication and collaboration with colleagues and students.

A study suggest that The use of digital platforms for grading and assessment can save teachers time and reduce their workload, allowing them to focus on other aspects of

teaching (He et al,, 2019). Technology can de automate routine tasks such as attendance talking and record keeping, freeing up time for teachers to engage in more meaningful teaching activities. These findings align with the existing literature on the use of technology in education to improve teacher productivity. Several studies have shown that technology can help to reduce administrative workload and increase efficiency in areas such as lesson planning and grading. Technology can also provide access to a wider range of teaching resources and facilitate communication and collaboration between teachers and students.

5.3 Summary of the findings;

These findings align with the existing literature, which has consistently shown that technology integration can enhance teacher productivity and student learning outcomes (Ertmer & Ottenbreit-Leftwich, 2010; Koehler & Mishra, 2009). Theories such as TPACK and SAMR also support these findings, as they emphasize the importance of effectively integrating technology into teaching practices to achieve better educational outcomes.

- It is important to note that the successful implementation of technology in Nigeria education requires proper training and support for teachers.
- The schools administrative should provide support for the use of technology as a means of improving teacher productivity in education.
- The findings also suggest that teachers who received training and ongoing support for the use of technology reported higher levels of productivity compared to those who did not.
- It is important to note the significance of professional development programs for teachers in effectively integrating technology into their teaching practices.
- Professional development programs in Nigeria who focused on technology integration, it is also necessary to ensure that all teachers have the skills and knowledge to effectively use technology in their teaching practices.
- It is important to note that not all teachers were equally proficient in using technology, which could lead to disparities in productivity gains.

The results of this study provide further evidence for the positive impact of technology on teacher productivity in education in Nigeria. These findings support the existing

literature and theoretical frameworks, emphasizing the importance of effective technology integration and professional development programs.

Research has shown that these tools can help to engage students and promote deeper learning, while also allowing teachers to provide more targeted and personalized feedback to individual students [Yilmaz, 2017]. Another review by Sonmark et al. [2017] examine the potential of technology to enhance teachers' professional development. The review found that technology can enable teachers to access a wider range of professional development opportunities including online courses and community of practice, and can also provide more personalized and just-in-time support.

This studies support the finding that technology can play a key role in promoting innovative and learner-centered approaches to teaching and learning, which can in turn enhance teacher productivity by increasing student engagement, motivation, and achievement. However, they also highlight the importance of careful consideration and evaluation of technology-based approaches to ensure that they align with instructional goals and are grounded in sound pedagogical principles. The literature indicates that technology can play a significant role in enhancing teacher productivity and supporting human resource development in education. By providing opportunities for collaboration, individualized learning, and automation of administrative tasks, technology can help to improve teacher effectiveness and create more efficient and effective learning environments. However, careful planning, training, and support are necessary to ensure a successful integration of technology into education and to address the challenges and barriers that may arise.

Study by Sanyal and colleagues (2012) explored the impact of technology on teacher productivity in schools, finding that the use of technology tools and resources can help to increase efficiency and save time for teachers for example, using digital grading and assessment tasks. The use of technology in education can have a significant impact on teacher productivity as part of human resource development. Through enhancing collaboration, automating administrative tasks, and providing access to digital resources and tools, technology can support teacher effectiveness and job satisfaction. However, careful planning, training, and support are necessary to address challenges and ensure successful integration of technology into education.

In conclusion, the findings from the qualitative research provide support for the use of technology as a means of improving teacher productivity in education. However, the successful implementation of technology requires proper training and support for teachers, and further research is needed to explore the most effective ways to provide this support. The findings from this study can contribute to the development of strategies for effectively integrating technology into teaching practices and improving teacher productivity in education.

CHAPTER VI

Recommendations According to Findings

This chapter is an important part of the research paper as it provides a roadmap for action based on the insights gained from the study.

"Recommendations According to Findings," is a section of this research paper that outlines suggestions or proposals in light of the study's findings. The purpose of this chapter is to offer practical and actionable recommendations that could be implemented to address the issues identified in this study. In addition, this chapter will also acknowledge any limitation or restriction of the study and provide suggestions for future research. This can help to inform the next steps in shaping the formulation of policies and practices pertaining to the utilization of technology in education.

In this context the investigation into the use of technology in enhancing teacher productivity in Secondary schools in Nigeria, the researcher recommendations include;

1. Providing professional development avenues for teachers to acquire proficiency in utilizing technology effectively.
2. Improving access to technology resources, providing ongoing support for teachers in their implementation of technology into their teaching, and exploring ways to reduce teachers' workload.
3. Regularly training and development programs should be conducted for teachers on the effective use of technology.

- **Increase access to technology and digital resources:** with research indicating that teachers often experience high levels of stress and due to heavy workloads and competing demands [Skaalvik & Skaalvik, 2017]. based on the finding that technology can positively impact teacher productivity. It is recommended that schools and educational institutions in Nigeria invest in providing teachers with the necessary hardware, software, and digital resources to support their teaching and administrative tasks.
- **Provide regular professional development opportunities:** A review by Sonmark et al. [2017] examined the potential of technology to enhance teacher professional development. The study found that professional development

programs can help teachers feel more confident and comfortable with technology, leading to increased productivity. Therefore, it is recommended that educational institutions in Nigeria provide regular training sessions and professional development opportunities to help secondary school teachers' remains current with the latest technology and teaching methods.

- **Prioritize teacher workload and support:** Technology can also assist in reducing administrative workload, such as grading and recording-keeping, thereby allowing teachers to focus more on lesson planning and instructional delivery [Starr &Tavis, 2018]. The study found that high teacher workload can negatively impact productivity, so it is recommended that educational institutions prioritize reducing workload and providing support services such as teacher aides, administrative assistants, and technology support staff.
- **Encourage collaboration and communication among teachers**: A study by Warsechauer and Matuchniak [2010] found that online communities of practices, can be effective in supporting teachers' collaboration and knowledge sharing, particularly when they are designed to be user-friendly, flexible, and responsive to teacher's needs. The study found that collaboration and communication among teachers can positively impact productivity. Therefore, it is recommended that educational institutions encourage and facilitate opportunities for teachers to collaborate and communicate with one another, such as through team teaching, regular meetings, and professional learning communities.
- **Conduct regular assessments of technology use and productivity**: the importance of a supportive school culture and leadership in fostering the effective use of technology in education and enhancing teacher productivity [Zhang et al, 2018]. To ensure that technology is being used effectively and to monitor its impact on teacher productivity, it is recommended that educational institutions conduct regular assessments of technology use and productivity. This can help identify areas for improvement and guide future decision-making around technology investments and professional development opportunities.
- **Training and Professional Development:** A study by Wang and Li [2018] investigated the use of technology to enhanced teachers' professional development in china. Another study by Tondeur, J, Van Baak, J., Sang, G, Voogt, J., Fisser, P., Ottenbreit- Leftwich A. [2017] suggest that technology

have a positive impact on teachers productivity particularly, when it is used to support collaboration automate administrative tasks, and provide access to professional development opportunities. Based on these finding, offering continuous training and professional development for secondary school teachers in Nigeria to improve their technology skills and competencies. This would ensure that they are better equipped to incorporate technology into their teaching practices and remain updated on the latest advancements in technologies and teaching methodology strategies.

- **Collaboration and Peer Learning:** Taking into account factors such as student learning styles, teacher's preferences, and availability of resources [Robinson 2018]. This study supports the researcher finding that encourage collaboration and peer learning among teachers to share best practices and insights on the proficient utilization of technology in the classroom. This would foster a culture of innovation and continuous improvement, leading to better productivity and outcomes for teachers and students.
- **Flexibility and Adaptability:** A research by Zhang and colleagues [2016] found that teachers in rural areas may face challenges in accessing technology and digital resources, leading to lower levels of technology integration and reduced productivity. Therefore, it is important to ensure that secondary school teachers in Nigeria have the flexibility and adaptability to adjust to changing technologies and teaching methods. This would require ongoing support and training, as well as a willingness to embrace new technologies and approaches.

The outcome of this study indicate that the utilization of technology can have a significant beneficial effect on teacher productivity as part of human resources development in education. However, for technology to be most effective, it must be accompanied by supportive policies, resources, and training that enable teachers to use these tools effectively in Nigeria secondary schools.

Firstly, the secondary school's administrators and policymakers should prioritize the provision of up-to-date technological tools and resources that support teaching and learning in secondary schools in Nigeria. This includes hardware such as computers, tablets, and projectors, as well as software applications that can facilitate instruction and assessment.

Teachers should be trained in how to use these tools effectively, and ongoing support and continuous development opportunities should be made available to ensure that teachers are confident and competent in their use.

Secondly, it is crucial to acknowledge the influence of workload on teacher productivity, particularly when implementing new technologies. Therefore, efforts should be made to reduce non-teaching responsibilities, such as administrative tasks, to allow teachers more time to focus on teaching and learning. In addition, scheduling and planning should be reviewed to ensure that sufficient time is allocated for teachers to learn and incorporate new technologies into their teaching practice in Nigeria secondary schools.

Thirdly, teacher motivation plays a critical role in their productivity. Therefore, it is important to create a positive and supportive school culture that recognizes and values the contributions of teachers. This can be achieved through regular communication, feedback, and recognition of their achievements. In addition, opportunities for collaboration and peer learning should be created, allowing teachers in Nigeria secondary schools to share ideas and best practices related to the use of technology.

Finally, it is important to conduct ongoing research and evaluation to assess the effectiveness of technology in improving teacher productivity and student learning outcomes. This can involve the use of standardized assessments, surveys, and classroom observations to track progress and identify areas for improvement.

6.1 Recommendation for further research;

This study typically presents actionable suggestions derived from the outcome of the study. In the context of the role of technology in enhancing the productivity of teachers as part of human resource development in education, this chapter provide recommendations on how technology can be integrated into the education sector to improve the productivity of teachers.

After conducting the study, there are still areas that require further research. The following are recommendations for further research in Secondary schools in Nigeria.

1. Investigate the impact of specific types of technology on teacher productivity: while this study primarily centered on the broad application of technology in education. Future research could examine the impact of specific types of

technology, such as learning management systems or educational apps, on teacher productivity.

2. Examine the relationship between teacher workload and the utilization of technology: While this study found that the use of technology can increase teacher productivity, further investigation is required to comprehend how workload impacts the effectiveness of technology in improving productivity.
3. Analyze the impact of teacher motivation on technology adoption: Future research could explore the interplay between teacher enthusiasm and their willingness to adopt technology in the classroom, which could have significant implications for human resource development in education.
4. Investigate the influence of professional development on the adoption of technology: Future research could investigate the influence of different types of teacher's training imitative programs [PD] on teacher adoption of technology and their subsequent impact on productivity.
5. Investigate the influence of technological implementation on student academic achievement: While this study focused on the impact of technology on teacher productivity, it is also important to examine how technology can improve student learning outcomes, which could provide further support for investment in technology in education.
6. Investigating the role of teacher motivation: This study found that teacher motivation can impact productivity, but future research could examine the factors that influence teacher motivation and how it can be increased.
7. Examining the effectiveness of teacher training initiatives and professional development programs [PD]: This study found that teacher training initiatives can have a positive impact on teacher productivity, but future research could investigate the effectiveness of specific types of teacher training initiatives and professional development [PD] programs and their impact on teacher productivity.

Overall, further research is needed to deepen our comprehension of the influence of technology on education and teacher productivity, and to identify effective strategies for embedding technology in the learning environment. By addressing these research gaps, we can continue to better understand the role of technology in education and

how it can be effectively utilized to improve teacher productivity and student outcomes.

In conclusion, the findings suggest that technology can fulfill a crucial and significant role in enhancing teacher productivity and supporting human resource development in education, particularly when it is integrated in a thoughtful and strategic manner. Nonetheless, it is vital to consider the challenges and obstacles to successful integration, and to develop initiatives and strategies that address these challenges and promote fair and equal availability of technology resources and professional development opportunities for the entire teaching faculty.

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APENDIX A

Survey Questions

The role of Technology on the Productivity of Teachers as part of Human Resources Development in Education.

CASE STUDY; SECONDARY SCHOOLS IN NIGERIA.

PART 1; Demographic assessment of the participants;

1. POSITION

2. GENDER;
   MALE
   FEMALE

3. AGE
   18-25
   26-30
   31-35
   41-45
   46-50
   50 above

PART 2. Open-ended question;

1. What role does technology play in helping the teachers teach students in terms of learning and teaching process?

2. How do you think the role of teachers has changed with the use of technology in the classroom?

3. As a teacher, how has the use of technology in education motivates students to get more involved in learning activities?

4. What kind of improved technology do you think teachers need or can use to stimulate the effective learning and motivation of their students?

5. Why is it important for teachers to have knowledge on the use of technology in a digital classroom?

6. How does the integration of technology benefit the learning of students?

7. How does the integration of technology affect the learning of students?

8. How do you think the implementation and improvement of technology will enhance the teacher's productivity in education?

9. Is there any learning management system put in place on the use of technology for teacher's productivity?

10. Given that the use of technology is applied in school, how have it promoted the development of communication skills between the teacher and student?

11. How has the use of technology increased academic achievement?

12. As a teacher, do you think the use of technology eases the pressure on a teacher in what team?

13. As a teacher, what do you think are the challenges or problems to look at to improve the technology used by teachers in schools?

APPENDIX B

Participants Letter of Consent

Dear Participant,

This questionnaire is a component of an ongoing research study aimed at to discuss and understand different viewpoints, new ideas and perspectives of teachers on how technology can be improved in schools as part of teacher's productivity in education. The information gathered from this questionnaire will be utilized to gain insight into the importance of technology in education, how technology can improve the teacher's productivity in various schools. By completing the following scale, you consent to participate in this study. Please be aware that your involvement in the study is voluntary, and your decision to participate or not will not have any impact on your work or result in any issues related to school management. Your personal information will remain confidential and will not be disclosed to any external parties. The data collected for this study will be strictly used for academic research purposes and may be shared through national/international academic conferences or publications. You have the freedom to withdraw from the study at any time by reaching out to us. Should you choose to opt out, your data will be promptly deleted from our records and will not be utilized in any subsequent stages of the research. If you have any inquiries or apprehensions, please feel free to contact us using the provided information below.

Student: Isidore Adaugo Philiper

Near East University

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E-mail: firsteagleempire@gmail.com

NEAR EAST UNIVERSITY

SCIENTIFIC RESEARCH ETHICS COMMITTEE

15.03.2023

Dear Adaugo Isidore philiper

Your application titled **"The role of technology on the productivity of teachers as part of human resources development in education"** with the application number NEU/ES/2023/963 has been evaluated by the Scientific Research Ethics Committee and granted approval. You can start your research on the condition that you will abide by the information provided in your application form.

Prof. Dr. Aşkın KİRAZ

The Coordinator of the Scientific Research Ethics Committee

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ORIGINALITY REPORT

10%	7%	6%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Marco Tavanti. "Developing Sustainability in Organizations", Springer Science and Business Media LLC, 2023 Publication	1%
2	uamd.edu.al Internet Source	1%
3	scholarworks.waldenu.edu Internet Source	1%
4	S Divya Meena, G Sai Shankar Mithesh, Ruchitha Panyam, Mandhadapu Samsritha Chowdary, Vamsi Suhas Sadhu, J Sheela. "Advancing Education through Metaverse: Components, Applications, Challenges, Case Studies and Open Issues", 2023 International Conference on Sustainable Computing and Smart Systems (ICSCSS), 2023 Publication	1%
5	"International Handbook of Research on Teachers and Teaching", Springer Science and Business Media LLC, 2009 Publication	1%