PERCEPTION, SELF-EFFICACY AND INTEREST TOWARDS UTILIZATION OF VIRTUAL REALITY LEARNING AMONG LECTURERS OF FEDERAL UNIVERSITY OF TECHNOLOGY MINNA NIGER STATE

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ABSTRACT

This study determines the perception, self-efficacy and interest towards the utilization of virtual reality by lecturers at the Federal University of Technology Minna, Niger State. Three research questions were raised and answered. This study adopts the descriptive survey research design. The target population for the study consisted of all the lecturers in the School of Science and Technology Education (SSTE), Federal University of Technology Minna. The sample size for the study is thirty (30) teachers which consisted of twenty-four (24) male lecturers and six (06) female lecturers. The sample size was ascertained using the simple random sampling technique. The instrument for data collection titled "Perception, Self-efficacy and Interest towards Utilization of Virtual Reality" (PSIUVR). The instruments were validated by educational technology experts and a reliability test was carried out using the Pearson's Product Moment Correlation Coefficient (PPMC) which gave a reliability index score of r=0.67. The data was analyzed using the mean, standard deviation and t-test statistics. The findings revealed that lecturers held positive perception towards the utilization of virtual technology at the Federal University of Technology, Minna, Lecturers has self-efficacy towards the utilization of virtual technology at the Federal University of Technology, Minna. Lecturers has interest towards the utilization of virtual technology at the Federal University of Technology, Minna. The study made recommendations amongst others, which included that the Federal ministry of education should provide virtual reality technologies in all the Federal Universities in Niger

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TABLE OF CONTENTS

CHAPTER FOUR: PRESENTATION AND ANALYSIS OF DATA

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

Various definitions of virtual reality exist in the literature according to perspective. For example, virtual reality can be viewed from functional and technical stand points (Fuchs et al., 2011; Fuchs et al., 2017). From a rudimentary position, the main aim of virtual reality is to create the illusion of being in another place or immersed in a different environment. The concept of immersive virtual reality is dependent on the VR technology to achieve thisexperience (Konstantine et al., 2014). In the domain of VR, the notion of presence relates to a "psychological state or subjective perception"of an individual which is generated through the use of the VR technology (International Society for Presence Research, 2000). Defining virtual reality can be problematic in the sense that definitions of the term also relate to the applications and techniques on where it is applied (Fuchs et al., 2011; Fuchs et al., 2017). Furthermore, Ludlow (2015) states that virtual reality technologies can be classified into distinct categories: true virtual reality; mixed reality; and augmented reality. True virtual reality allows for an imitated world to be created that immerses the user. In contrast, mixed reality integrates and embeds the artificial world with the real one to enhance the user experience. It is however distinct in the sense that it adds information to the physical world in conjunction with the real world (Fuchs et al., 2011; Fuchs et al., 2017).

Despite the various perceptions of how you define virtual reality, the concepts of immersion, interaction and presence are often associated with it. However, the hardware and software used

to transform the interaction from the real world to the virtual world need to be considered due to use of equipment such as VR headsets and tracked handheld controllers.

According to Fuchs et al. (2011) and Fuchs et al. (2017), virtual reality is both scientific and technical in nature, making use of computer science and behavioural interfaces to facilitate real-time interaction in a virtual world. One of the salient outcomes of VR is an experience equating to “pseudo-natural immersion”. Pan et al. (2006) states that VR is “the use of computer graphics systems in combination with various display and interface devices to provide the effect of immersion in the interactive 3D computer-generated environment”. Another definition provided by Schofield (2014) states that VR technology encompasses interactive, real-time, three-dimensional graphical environments that respond to user input and action, such as moving around in the virtual world or operating virtual equipment”. It has been stated that three of the main characteristics associated with VR are the qualities of immersion, interaction and imagination (Hafner et al., 2013).

Furthermore, VR technology is continuing to permeate into educational settings at an accelerated rate. The pedagogical affordances of VR have been acknowledged from a tertiary perspective assisting students to enhance, for example, their social and communication skills (Hafner et al., 2013). Though the application of VR appears to be moderately prevalent from an empirical viewpoint it could be argued that the majority of studies predominately focus upon the context or application of VR in relation to subject area and discipline (Kavanagh et al., 2017). The basis of the research presented in this paper is to ascertain creative computing undergraduate students’views about the use of VR technology within their respective programmes. Students were primarily asked to reflect via a questionnaire what their general perceptions of VR were, its

applications from a pedagogical outlook in addition to whether it might provide beneficial teaching and learning benefits within their programmes.

The use of technological tools is increasing rapidly in all fields, especially in education, which has moved from pen, pencil, and books, to using interactive technologies to help impart knowledge and understanding. Recent years have witnessed students facilitating immersive digital technology. However, it remains a challenge to provide sufficient learning medias to higher education students. The lack of novel technologies in the learning process does not necessarily mean that the students' educational level will be affected, but it may result in the need for extra efforts from both students and instructors in some fields. In order to allow education to catch up with technology, technological tools need to be utilized in the educational process. Virtual Reality (VR) is considered one of the novel options to add value to the learning journey. VR enables students to discover and explore their own knowledge. Furthermore, it makes the learning process more interesting, which improves students' motivation and attention. To ensure the actual active use of VR technology when embedded in higher education institutions, various factors that influence the acceptance or resistance of the technology integration should be examined prior to technology integration: lecturers perceptions, institutional support, barriers of integration, motivation for integration, prior technology experience, etc.

Self-efficacy refers to an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments (Lopez-Garrido, [7]2020). Self-efficacy reflects confidence in the ability to exert control over one's own motivation, behavior, and social environment. These cognitive self-evaluations influence all manner of human experience, including the goals for which people strive, the amount of energy expended towards goal

achievement, and likelihood of attaining particular levels of behavioral performance. Self-efficacy beliefs are an important factor in human motivation and behavior, and in influencing emotion and action. Self-Efficacy theory holds that performance and motivation are determined, in part, by how effective people believe they can be (Bandura, 1982). Bandura (1995) explained that it “refers to explanation required to manage prospective situations.” The most important component of self-efficacy is a person’s self-belief in their capabilities (Cherry, 2020), it is a task-specific version of self-esteem (Lunenburg, 2011), and its basic principle is that individuals are more likely to engage in activities for which they have a higher level and less likely to engage in those for which they lower ones (van der Bijl & Shortridge-Baggett, 2001). It influences people's learning abilities, their motivation, and their performance, as people will often attempt to learn and perform only those tasks in which they believe theywill be successful (Lunenburg, 2011).

Self-efficacy among teachers has been the focus of several studies in recent years. Most studies indicated that teachers with high-efficacy are better at teaching (Bautista & Boone, 2015). Nissim and Weissblueth (2017) described the extensive use of VR as a therapeutic tool or as an element of self-efficacy empowerment.

Virtual reality technologies have been largely driven by the booming gaming industry, but these new tools are increasingly being used for applications such as communication, employee training, virtual showrooms for retailers, and for touring homes. Now this tech is being incorporated into the classroom by educators. While only 2% of teachers have reported using VR in the classroom, in a 2016 survey 60% of teachers said they’d be interested in including VR in the classroom. In addition, 93% said their students would be excited to use VR and 83% said that VR might help improve learning outcomes (Walden University, 2021). By bringing learning to

life, VR technology has the potential to enhance the way students learn and to change the job of any educator with a teacher certification in elementary education and beyond.

From promoting understanding of learning concepts to increasing collaboration to improving motivation in the classroom, teachers have high hopes for the ways that VR can impact the learning experience for students. In a 2016 study of 40 high school students, supplementing classes with VR-enhanced curriculum led to improved student learning, test scores, learning comprehension, and retention. In addition, students in the VR learning group outperformed those in the traditional learning group. The use of a VR-based curriculum also helped students with below average academic performance bring up their grades, proving that the technology can be an important addition to teaching strategy in traditional education settings. For visual learners and students with learning challenges, VR could become a valuable addition to the classroom experience.

1.2 Statement of the Research Problem

Virtual reality provide a means teachers and students to improve their teaching and learning process by creating a simulated digital environment where learning can reach greater heights by opening up doors to activity based learning as virtual reality technologies provide a platform for concretized learning where students can easily interact with the learning content and are exposed to a wide range of resources either locally or via the internet. The aim of the virtual reality is to enhance and improve on already existing pedagogies that are utilized by lecturers at tertiary institutions so as to make learning easier, engaging and motivating. Presently, studies have shown that lecturers perceive virtual reality as a beneficial too in teaching and learning which increases their self efficacy. Research has also shown that lecturers have also shown interest in

utilizing virtual reality technologies into their teaching. Although, the problem of few studies carried out in Nigeria on the perception, self efficacy and interest towards the utilization of virtual reality by lecturers of Federal University of Technology Minna, Niger State. Hence, this study was designed to determine the perception, self efficacy and interest towards the utilization of virtual reality by lecturers of Federal University of Technology Minna, Niger State.

1.3 Aim and Objectives of the Study

The aim of this study is investigate the perception, self efficacy and interest towards the utilization of virtual reality by lecturers of Federal University of Technology Minna, Niger State.. Specifically, the study will achieve the following objectives:

i. Investigate the perception of lecturers on the utilization of virtual reality.
ii. Determine the self efficacy of lecturers on the utilization of virtual reality.
iii. Investigate the interest of lecturers on the utilization of virtual reality.

1.4 Research Questions

The following research questions will guide this study:

1. What is perception of lecturers on the utilization of virtual reality of the Federal University of Technology Minna?
2. What is the self efficacy of lecturers on the utilization of virtual reality of the Federal University of Technology Minna?
3. What is the interest of lecturers on the utilization of virtual reality in Federal University of Technology Minna?

1.5 Significance of the Study

The result of this research will be of immense importance or benefit to lecturers, students, parents, government and the society at large in the following ways:

The result of this research work will help lecturers in planning and the utilization of virtual reality and how they are to be used during teaching and learning so as to better understand the impact of virtual reality on students' academic performance. Lecturers will consult this study to gain valuable knowledge and information regarding the influence of virtual reality usage on the perception, self efficacy and interest, the frequent level of usage and how it influences academic performance.

The findings of this study will help enhance the learning of students by stimulating and motivating them through the generation of computer simulated learning environment. It will help them to overcome the challenges or difficulties they are facing during teaching and learning as smartphones can enhance academic achievement.

The result of this research will be of immense benefit to parents and the society at large since parents will realize the importance of virtual reality and develop the needed interest to support the utilization of virtual reality technologies. Parents will also realize the importance of virtual reality and how it directly stimulates their wards and provide efficiency during learning and also to the society since it will improve literacy level and build adequate comprehension and understanding skills.

Furthermore, this research work will serve as a reference source to the government when formulating and implementing policies that will improve teacher's competency with a view of making learning easier and enhancing national growth.

1.6 Scope of the Study

This study will focus on the perception, self efficacy and interest of lecturers of the Federal University of Technology Minna, Niger State. A researcher design questionnaires will be used as a researching instrument which will be administered to respondents. This study will cover all the lecturers from the Federal University of Technology in Minna, Niger State and will last for a period of four (4) weeks.

1.7 Operational Definition of Terms

Virtual reality: Graphics interface device to provide effect of immersion the 3D on computer generated environment for teaching and learning by lecturers.

Self-efficacy: sufficiency of knowledge among lecturers on utilization of virtual reality interface for teaching and learning.

Perception: lecturers consciousness of the existence of virtual reality interface for teaching and learning.

Interest: Lecturers opinions or feeling towards utilization of virtual reality interface for teaching and learning.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The major areas reviewed under this project work have been classified under the following subheadings; Conceptual framework, Theoretical framework, Empirical studies and Summary of literature Review.

2.1 Conceptual Framework

Science and technology play a vital role in the development of any nation. They are the predictors of success and development of any nation's economy. An alternative learning environment, called virtual reality, can help to make this crucial educational application available to students (Kumar, Pakala, Ragade, & Wong, 1998; Shin, Yoon, Park & Lee, 2000; Grob, 2002; SAVVIS, 2010; Jeschke, Richter, & Zorn, 2010). Virtual reality is a learning environment in which students can learn and carry out practical experiments just as they do in the real world (Woodfield, 2005). Virtual reality simulates a real classroom environment and processes. They provide students with meaningful virtual experiences and present important concepts, principles, and processes. By means of virtual reality, students have the opportunity of interacting with multimedia learning content capable of stimulating and motivating their senses.. Moreover, the interactive nature of such teaching methods offers a clear and enjoyable learning environment (Ardac & Akaygun, 2004, Jeschke, Richter, & Zorn, 2010). A virtual reality learning environment may sometimes be a preferable alternative, or simply a supportive learning environment, to real-life classrooms. It provides students with opportunities such as enriching their learning experiences; conducting experiments as if they were in real laboratories; and improving their learning related skills such as manipulating materials and equipment, collecting data, completing experiment process in an interactive way (with boundless supplies), and

preparing experiment reports (Subramanian & Marsic, 2001). Researchers have determined that instructions carried out with a virtual reality environment significantly increase student achievement levels (Dalgarno, Bishop, Adlong, & Bedgood, 2009; Yu, Brown, & Billet, 2005 & Tatli, & Ayas, 2013). Virtual environments let students observe the process in more detail, compared to board and chalk activities of the traditional classroom or partially completed experiments of the real laboratory environment. In addition, virtual environments foster attention and motivation towards the course by supporting a discussion platform among partners, peers, and among students and teachers (Dobson, 2009; Lawrence, 2011).

2.1.1 Concept of Information and Communication Technology

Information and Communications Technology (ICT) is an extended term for information technology (IT) which stresses the role of unified communications and the integration of telecommunications (wired and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information (Aibara, 2017). However, ICT has no universal definition, as the concepts, methods and applications involved in ICT are constantly evolving on an almost daily basis (Elisha, 2006). The broadness of ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form. e.g. personal computers, digital television, email, robots (Aibara, 2017).

Pratt (2019) observed that ICT is the fusion of infrastructure and components that enable modern computing. Fu (2013) noted that ICT provides practical experience and reflective engagement on critical issues related to Information and Communication Technologies in a workshop mode through presentations and seminars around selected readings, engaging student to understand the

role of ICT in education in relation to various policies and curriculum frameworks on ICT and in diverse socio-economic contexts. To assure that it provides a rich learning experience for students through various ICT tools to enable them. Information Technology in Education, is effective in the continuous developments in ICT on education (Ghavifekr, 2015). The pace of change brought about by new technologies has had a significant effect on the way people live, work, and play worldwide (Allen, 2019). New and emerging technologies challenge the traditional process of teaching and learning, and the way education is managed.

Information and communication technology is having major impact across all curriculum areas. Easy worldwide communication provides instant access to a vast array of data, challenging, assimilation and assessment skills. Rapid communication, plus increased access to IT in the home, at work, and in educational establishments, could mean that learning becomes a truly lifelong activity (Negi, Negi & Pandey, 2011). ICT continues to evolve very quickly and has now become a fundamental tool in many aspects of everyday life, both at home and in the workplace. Because of this, it is essential that all pupils gain the confidence and ability within this subject to prepare them for the challenge of a rapidly developing and changing technological world.

2.1.2 Information and Communication Technology in Education

Schools use a diverse set of ICT tools to communicate, create, disseminate, store, and manage information (UNESCO, 2021). Integration of ICT in the classroom is getting more important as it helps students in enhancing their collaborative learning skills as well as developing transversal skills that stimulate social skills, problem solving, self-reliance, responsibility and the capacity for reflection and initiative (Ghavifekr & Rosdy, 2015). In some contexts, ICT has also become

integral to the teaching-learning interaction, through such approaches as replacing chalkboards with interactive digital whiteboards, using students' own smartphones or other devices for learning during class time, and the "flipped classroom" model where students watch lectures at home on the computer and use classroom time for more interactive exercises (Vidhate, 2019). When teachers are digitally literate and trained to use ICT, these approaches can lead to higher order thinking skills, provide creative and individualized options for students to express their understandings, and leave students better prepared to deal with ongoing technological change in society and the workplace (Vidhate, 2019). ICT issues planners must consider include: considering the total cost-benefit equation, supplying and maintaining the requisite infrastructure, and ensuring investments are matched with teacher support and other policies aimed at effective ICT use (UNESCO, 2021).

2.1.3 Concept of Virtual Reality

Virtual Reality (VR) concept is a term that we often hear and familiar with nowadays by the development of computer technologies. Today, virtual reality technology is used in many fields such as vehicle and flight simulations, entertainment, product design, architectural design and interior arrangements, education, medicine with an increasing efficiency (Peng, 2011). Virtual reality is not limited by defining any technological approach or hardware fiction. But it's seen that this concept is used to describe different environments and systems by different researchers. The VR term is widely understood that it's a "non-immersive" computer simulation using 3D graphics and tools and providing interactive interaction (Oh *et al.*, 2004). Digital contents such as the internet, graphics, multimedia, etc. that are experienced only by basic components of a computer are meant here. Non-immersive VR is experienced by modern computer and game console systems in general. Users can be directed in the 3D graphical environment (without real

word occlusion) by means of a flat screen monitor or television in this format and interact (Kılıç, 2016). Despite the fact that such systems are less immersive, they are basically characterized as a virtual environment. Virtual environments (VE) provide a system to the user, which can be accessed in a commercially widespread manner, allow interaction with dynamic, digital content by using traditional computer and game interface devices (keyboard, mouse, game pads, joystick, etc.) (Kılıç, 2016).

According to the definition of some researchers, virtual reality technology is "immersive" systems including special I/O devices consisting of head mounted displays (HMD), gloves, haptic devices (haptic) or multiple displays and improves the 3D experience of the user (Oh *et al*., 2004). As a result of these definitions, two approaches as "immersive" and "non-immersive" emerge for VR (Kılıç, 2016). A user in the real environment perceives only the physical world. As long as moving across from real environment to the virtuality, enrichment of the physical world with virtual objects or other components, i.e. "Augmented Reality" emerges (Kılıç, 2016). A person in the virtual environment experiences a synthetic environment created by a computer as completely isolated from the physical world.

Virtual reality is the user entering a completely artificial environment (Bardi, 2019). The user cannot see the real world that surrounds him. What is meant in this definition is immersive virtual reality systems? Virtual reality environments having immersive features are interactive computer simulations that create a mentally drift perception or perception of being in the simulation environment and allow users to interact or move (Bohil *et al*, 2009). Basically, a virtual reality environment is the environment, where the observer enters in an artificial and three-dimensional world by leaving the real environment, interacts such as being, walking there, change locations and features of objects and as a result of these interactions, gets sensory

reactions as in the real world (Kılıç, 2016). Virtual reality should include four basic components: virtual environment, immersion, sensory feedback (as reaction against the user's movements) and interaction (Muhanna, 2015).

A virtual learning environment (VLE) in educational technology is a web-based platform for the digital aspects of courses of study, usually within educational institutions (Wikipedia, 2021). They present resources, activities, and interactions within a course structure and provide for the different stages of assessment. VLEs also usually report on participation; and have some level of integration with other institutional systems. For teachers and instructors who edit them, VLEs may have a role as authoring and design environments. VLEs have been adopted by almost all higher education institutions in the English-speaking world. Alphin (2014) noted that a virtual learning environment (VLE) is a computer-based synchronous and asynchronous higher education learning system that includes learning management systems,

2.1.4 Learning in a Virtual Environment

Reisoğlu *et al* (2017) observed that users of virtual environments are able to access virtual contents simultaneously, share information, receive multifaceted feedback (Cheng and Wang 2011), and conduct activities by interacting with objects and individuals from online connection points in different locations. The field of education has seen the use of digital virtual worlds for several years (Clifford, 2012), increased advances in capabilities of educational technology has resulted in massive use of multi-users virtual worlds: this has fed interests in educational application and the use of Virtual Learning Environments (VLEs). Besides, VLE has enabled the educational world to sell their products online thus, public and private sector education view students as consumers (Nwabude *et al*, 2020).

Although, virtual learning has the potentials to offer good and distance education comparable to physical classroom situation in the developed environment (Murphy, 2020), some parts of the developing world appear to struggle in harnessing and accessing these potentials to meet the needs of e-learning subscribers in this turbo-charged digital race (Nwabude *et al*, 2020). Essentially, several frameworks and models have been adopted by stakeholders towards implementing eLearning through the use of computers, technologies and the internet (Kılıç, 2016). Nwabude (2020) defined a virtual learning environment as a physical, intellectual, and psychological environment which facilitates learning through connectivity and community. Following this definition, the Joint Information Systems Committee (JISC) in July 2000, recommends that the term 'virtual learning environment' ('VLE') should also refer to 'the components in which learners and instructors participate in "online" interactions of various kinds, including distance on-line learning' (JISC, 2001).

With these definitions and additions in the minds of computer and technology scientists, software developers, and education managers, comes the realization that a VLE indeed describes a particular toolset designed for and with instructors and learners in mind (Nwabude *et al*, 2020). Virtual Learning Environment (VLE) offers the ability to schedule a range of learning activities and make tools available rather than just managing contents (Schlater, 2009). In other words, a VLE provides necessary tools which might enhance a student's learning experience and also provides flexible environments where students might choose to learn at a time suitable.

Broadening our knowledge of a VLE further is the concept as a one stop shop from the European Schoolnet (EUN, 2003) which argues that the evolution of VLE and its success is dependent upon the integration of such components as course outlines, email, conference tools, threaded discussions, home pages, assignments, assessments, feedback tools, multimedia resources, Web

publishing, chat and diagnostic tools, file upload with tools for building knowledge and linking administrative information. Underlying all these definitions and concepts are two central meanings: first, the virtual learning environment supports a social constructivist approach to teaching and learning Konrad, 2003 and Oliver & Harrington, 2003).

Second, it "provides learners with all the facilities and learning opportunities that they experience in a face-to-face teaching situation even with added advantages of flexibility of access to digital discussion, support, resources, and assessment" (Nwabude, 2020). Thus, implies that a VLE platform has the capability to increase learners' tendency to learn, to multitask and to develop social autonomy through added tools and flexible learning environment. It also provides learners with the extended programme beyond the four walls of the classroom anywhere, anytime as long as the learner has log-in access to the virtual classroom through the Institution's portal. Although, VLE cannot work on its own except there is a working internet connected to a computer system and both lecturers and students possess the e-skills and knowledge to access, use and interact with it.

2.1.5 Self efficacy towards utilization of virtual reality

Using technology in education makes learning and teaching more meaningful, advanced, and future-oriented. VR is increasingly used as an educational mode of learning and teaching with a purpose of enriching learning processes. It stimulates interest and enhances the concentration of students by teaching through otherwise impossible experiences, allowing the use of experimental tools, presented as virtual objects, directly to their hands (Ahn & Cho, 2015). Self-efficacy implies to a person's perception of his or her ability to control his or her functions in response to circumstances (Bandura 1997). Gilbert, Voelkel and Johnson (2018) asserted that 'immersive

simulation provides authentic learning opportunities and support pedagogy, allowing skill development in a risk-free environment'.

The purpose of Virtual Reality for learning is to provide effective learning environments that enable learners to perceive the knowledge and necessary skills to perform tasks in real-world and educational settings. Virtual Reality environments give learners the ability to visit and interact with locations where distance, occasion and safety can be barriers to learning (O'Neil and Perez 2006). The study regarding education by using immersive simulations with AR technology shows that it can help students to improve their self-efficacy (Gilbert et al. 2018). Learners with high levels of computer self-efficacy are less likely to express anxiety and frustration regarding the use of educational technology. Essmiller *et al.* (2020) observed that self-efficacy among teachers has been the focus of several studies in recent years. Most studies indicated that teachers with high-efficacy are better at teaching (Bautista & Boone, 2015). Several studies described the extensive use of VR as a therapeutic tool or as an element of self-efficacy empowerment. Most of these studies are based on Gist & Mitchell (1992) theory. Their model consists of four distinct factors that contribute to the increase and empowerment of students' self-efficacy. These factors include the following aspects: physiological arousal, verbal persuasion, vicarious experience, and enactive mastery. Their model and theory were formed within a psychological framework prior to the information technology revolution. We therefore wanted to test this theory in a learning environment using VR. The current investigation was based on the emotional aspects of student teachers during training in the construction of a 3D educational creation in a VR learning environment.

Cheng and Tsai (2019) pointed out the function of self-efficacy in the individual decision of learning motivation to appear significant effects on the learning process and effect. People with

higher self-efficacy presented more frequent self-judgment behavior and better self-learning motivation. Chang et al. (2019) revealed that pupils with stronger self-efficacy would enhance the individual self-confidence through the feedback of learning experience, self-evaluation process, and learning outcome on self-efficacy to present higher learning motivation. Hwang et al. (2019) mentioned that some studies pointed out the remarkably positive correlations between self-efficacy and learning motivation that the higher self-efficacy, the higher learning motivation.

Lei et al. (2019) argued that self-efficacy contains three dimensions;

1. Cognitive influence: People with higher self-efficacy present higher ambition and longer points of view are more thoughtful, and more willing to accept the difficult challenges and would firmly devote themselves to those challenges.

2. Motivational influence: The belief in self-efficacy to be able to complete certain affairs would affect people's goal setting, action strategy, willingness to make efforts, persistence to face a challenge, and degree of recovery from frustration.

3. Affective influence: The bearable pressure, when people encounter dilemmas or threats, is mostly decided by the degree of their consideration of completing the affair.

Hsiao (2021) revealed that teachers with higher self-efficacy in the application of virtual reality to experiential education would enhance the learning motivation. The literature is rich with descriptions of the successes of student teachers whose teachers constructed their lessons with educational themes that were congruent with the new subject matter related to their academic disciplines (Nissim et al., 2016; Weissblueth et al., 2014). Among educational themes lies VR. VR enables teachers, lecturers, or anyone in an educational setting to devise and deliver complex

information in a visually attractive way. There is a tendency to think that many students find it easier to learn when presented with a visual explanation, one that they also find easier to retain and recall. Chen (2006) asserted that: “although VR is recognized as an impressive learning tool, there are still many issues that need further investigation, including identifying the appropriate theories and/or models to guide its design and development, investigating how its attributes are able to support learning, finding out whether its use can improve the intended performance and understanding, investigating ways to reach more effective learning when using this technology, and investigating its impact on learners with different aptitudes". Her research resulted in insights on a feasible instructional design theoretical framework, as well as an instructional development framework for VR based learning environments (Chen, 2006).

Pantelidis (2010) suggested that VR motivates students. It does so by requiring interaction and encouraging active rather than passive participation. Some types of VR encourage or require collaboration and provide a social atmosphere to support it. For example, using text input in virtual worlds. VR allows the learner to proceed through an experience at their own pace, over a broad time scale that is not fixed by a regular class schedule. It allows the disabled to participate in an experiment or learning environment when they cannot do so otherwise. It transcends language barriers. VR with text access provides equal opportunity for communication with students in other cultures and allows the student to take on the role of a person in different cultures (Kim & Ko, 2012). Thus, VR creates a virtual world to teach experientially about the real world whether in the past, present or future. It is a significant learning program which surpasses the conventional learning class boundaries, place and space. For the purposes of structured learning space, it allows ample room for creativity and almost boundless learning possibilities. One goal of VR in an educational setting is to make the learning environment of

VR - a learning lab, another classroom online, and a learning method empowering abilities, learning skills, and creativity (Kim & Ko, 2012).

2.1.6 Interest towards the utilization of virtual reality

Consequently, Africa and many of the third world countries have, to date, continued to lag behind their first world counterparts in terms of scientific activity and quality of life (Pearson & Kudzai, 2015). Advancements in the information and communication technology has opened up real opportunities for developing nationsto narrow the gap betweenthem and the developed nations. Of particular interest to this study is to evaluate the interest of lecturers towards the utilization of virtual reality.

Virsabi (n.d) revealed that there has been increasing interest in the utilization of virtual reality. Yildirim *et al*. (2020) revealed that teachers favored the use of virtual reality in the classroom for teaching and learninh. The impact of educational technology use on the teaching and learning processes can vary. For example, Stone, Watts, and Zhong (2011) found the use of VR technology can be positively impactful on skill development processes. However, Wenglinsky (1998) cautioned “technology could matter, but that this depended on how it was used”. Wenglinsky (1998) further admonished that quantity of availability and use of educational technology does not necessarily equate to improved educational impact; rather, practitioners should carefully consider how a type of educational technology is employed in order to maximize the learning potential. Phipps, Osborne, Dyer, and Ball (2008) acknowledged educational technologies can be powerful tools for teaching and learning in school-based settings. Mimicking the nature of educational technology in education more broadly, educational technologies used in SBAE have evolved considerably. Teachers recognize the value of

integrating educational technologies into their curricula (Williams, Warner, Flowers, & Croom, 2014b). Teachers have indicated their local school districts and administrators are supportive of infusing educational technologies into educational programs (Smith *et al*., 2018; Williams *et al*., 2014b).

Williams *et al*. (2014) found North Carolina teachers often have access to or use certain types of educational technology, such as desktop computers, but not always others, such as simulation and visualization programs. Barriers such as cost may inhibit educational technology adoption and use (Alston, Miller, & Williams, 2003; Coley, Warner, Stair, Flowers, & Croom, 2015; Williams *et al*., 2014b), which may result in missed opportunities for progress and change. Kotrlik, Redmann, and Douglas (2003) cautioned "that much more needs to be done to encourage and support teachers in the teaching/learning process". As such, progress is a prerequisite for useful change. Kotrlik *et al*. (2003) advised effective change regarding educational technology integration and education can be implemented by stakeholders in education. Anderson and Williams (2012) noted a considerable number of teachers have taught themselves how to use the technologies available to them. As such, teachers may be willing to learn how to use available technologies if benefits are expected.

Baird (2018) argued that some teachers shared negative sentiment related to the lack of support from school administrators or their school IT services during the VR pilot program. Teachers reported that the use of VR in an educational context should be "explicit in its purpose, especially since VR can blur the line between what is real and what is someone's perspective."

2.2 Theoretical Framework

Two major theories that support the use of e-learning in classroom teaching and learning selected by the researcher for this study include: the technology acceptance model and the constructivism learning theory.

2.2.1 Technology Acceptance Model

The technology acceptance model (TAM) build the theoretical framework in this research. TAM states that the perceived ease of using a system and the perceived usefulness are the key components of technology acceptance. However, with increasing diversity of users as well as diversity of technical systems (visible vs. invisible, local vs. distributed) and using contexts (fun and entertainment, medical, office, mobility) the end-users are confronted with, more aspects might be relevant for understanding their acceptance patterns – beyond the ease of using a system and the perceived usefulness. The Technology Acceptance Model (TAM) is a theory of information systems that models how people come to adopt and use technology. The model stresses the importance of technological use for all individuals. It should be recognized that there must be a behavioural intention (BI), which is a phenomenon that pulls people to use technology. This model's proponents observed that behavioural intention (BI) is determined by attitude (A), which is described as the overall perception of technology.

According to the model, as consumers are offered modern technologies to use, a variety of considerations affect their choice to use those technologies. Some of which include:

1. Perceived usefulness (PU): this is seen as the length at which a person feels using a certain technology will improve his or her job efficiency. This means that students who will most likely use assistive technologies will understand how effective they are in completing a specific task.

2. Perceived ease-of-use (PEOU)- this factor describes how easy or difficult it will be to use a certain piece of technology. If a technology is relatively simple to use, consumers may have a favourable outlook toward it. People using assistive technologies, for example, may often use their phones or applications whether they are simple to use and do not need a lot of effort.

Other influences, such as social impact, age, and gender, may influence individuals' use of technology and their overall understanding of it.

2.2.2 Constructivism Learning Theory

Constructivism learning theory emphasises the importance of learners developing their comprehension and skills from their own experiences. Constructivists conclude that information from the world interacts with ideas from the person, resulting in internalised constructs formed by learners. Constructivists have identified the assimilation and accommodation mechanisms that are critical in this relationship as people construct new insights from their interactions. They assume that as people assimilate new content, it becomes part of an already established body of information or expertise. Constructivism seeks to understand how learners learn by drawing on prior experiences and constructing their own knowledge from those experiences. This suggests that constructivism promotes constructive learning, in which students regularly participate in the classroom and contribute to the teaching and learning process. Aside from learning by doing (active learning), constructivism promotes social interactions and peer interactions among learners. This learning philosophy supports various ways of communication and engagement. Social constructivism not only respects the learner's individuality and ambiguity, it also

promotes, employs, and rewards it as an important part of the learning experience. (Wikipedia, 2020).

2.3 Empirical Studies

Nissim and Weissblueth (2017) explored the experiences of pre-service student teachers in a teaching unit in VR within a special course framework which was intended to enhance student-teacher's 21st century skills and growth processes. In particular, how their experiences working with VR affected their self-efficacy. The research population comprised 176 students studying in their second of a four years training course to become teachers in the K-12 educational system. The main research question was: Do teaching approaches employing VR effect student teachers' self-efficacy, interests, and creativity? If so, what are these effects? How does collaboration in VR classrooms foster learners' social integration? The main findings of this study showed that using VR learning environments with student teachers helped them increase their self-efficacy and allowed them to be more innovative and creative. VR challenges learners with active teaching and learning, making student teachers active participants who create and innovate.

Hsiao (2021) investigated the effects of the application of virtual reality to experiential education on self-efficacy and learning motivation of social Workers. He carried out a study on social workers in southern Taiwan as the research objects, a total of 227 social workers preceded the 15-week (3 hours per week for a total of 45 hours) experimental research with the application of virtual reality to experiential education. The research results summarize that (1) experiential education with virtual reality would affect self-efficacy, (2) experiential education with virtual reality would affect learning motivation, and (3) self-efficacy reveals remarkably positive effects on learning motivation. According to the results, it is expected to increase the interaction among

the social workers through the learning activity and internalize the experience in the practical learning process of communication, problem solving, and extrinsic interaction for the application to the work to achieve a better life.

Wells and Miller (2020) describe the opinions teachers have regarding VR technology in SBAE. Following Dillman, Smyth, and Christian's (2014) recommendations, we used an Internet-based questionnaire to collect data from 90 SBAE teachers in Iowa during the 2017-2018 academic year. Our results indicated the teachers generally held favorable opinions about VR technology intertwined with a considerable degree of uncertainty about the technology and its uses. To facilitate opportunities for VR technology-related professional development, we recommend agricultural teacher education faculty develop their own knowledge and skills related to VR technology applications.

Yildirim *et al.* (2020) determines teachers' opinions about virtual reality (VR). Virtual Reality Interview Form (VRIF) administered to seven teachers after the implementation of VR practices. Teachers received three weeks of intensive training. Afterward, teachers applied VR for two months in their classrooms. Later, interviews were held with them. Findings indicated that different VR practices, including Google Cardboard, were used in the classroom. According to the teachers, using virtual reality in the classroom captured students' interest, increased their creativity, allowed students to take virtual trips, increased students' motivation, improved students' technology literacy, individualized learning; made it easier for students to understand difficult concepts. The potential problems of using VR were not asked of the teachers; however, teachers mentioned that online safety and security, student access, and technology gaps were the problems they faced. The findings of this study suggest that the use of VR allows teachers to visualize abstract topics and enrich instruction. A VR orientation module would provide teachers

with opportunities to learn, practice, and apply their VR skills before being placed in the classroom.

2.4 Summary of Literature Reviewed

The study reviewed several literature under three major subheadings; the conceptual framework reviewed the following concepts; information and communication technology (ICT), information and communication technology in education, concept of virtual reality, learning in a virtual environment, self-efficacy towards the utilization of virtual reality and interest towards the utilization of virtual reality. The next subheading was the theoretical framework, two theories were identified to be relevant to the study, these were the technology acceptance model and the constructivism learning theory. The last subheading; empirical studies reviewed the findings of related literature, these findings revealed that some lecturers had positive perception, self-efficacy and showed interest towards the use of virtual reality while some findings revealed contrary opinions.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Research Design

The survey research design is adopted for the study in which questionnaires are used to collect information from the respondents. The survey design is perhaps the most frequent and

appropriate for this study because it facilitates the collection of data for the purpose of describing, analyzing and interpreting the circumstances prevailing at the time of the study.

3.2 Population of the Study

The study population will be all the lecturers in Federal University of Technology Minna. The target population of the study consists of all the lecturers in the School of Science and Technology Education (SSTE), Federal University of Technology Minna.

3.2 Sample and Sampling Technique

A sample refers to a small group of elements drawn through a definite produce from a specific population. Shapiro (2008) refers to the sample as the "number of units that were chosen from which data were gathered". Ten (10) lecturers were randomly sampled using the hat trick technique from each of the three (3) Departments; this gave a total of 30 respondents for the study. The sample was randomly taken using the simple random sampling from the three (3) departments in the school of science and technology education (SSTE); Science Education, Educational Technology and Industrial and Technology Education Departments.

S/N	School	Gender		Population
		Male	Female	

1	Science Education	7	3	10
2	Educational Technology	8	2	10
3	Industrial and Technology Education	9	1	10
	Total	**24**	**6**	**30**

The total number of lecturers in the above table is thirty (30). A total of thirty (30) questionnaires will be distributed. to all the thirty (30) lecturers from the three departments.

3.4 Research Instrument

The instrument that will be used to collect data for the study is a questionnaire and a checklist titled "Perception, Self-efficacy and Interest towards Utilization of Virtual Reality" (PSIUVR), The instrument was made up of four sections A, B, C and D. Section A elicited personal data, section B will be made up of seven (7) items aimed at finding out the perception of lecturers towards the utilization of virtual reality, section C will be having seven (7) items aimed at finding out the self-efficacy of lecturers towards the utilization of virtual reality and section D was made up of six (6) items aimed at finding out the interest of lecturers towards the utilization

of virtual reality. Section B, C and D requires the respondents to respond to the items on a four point scale of Strongly Agree, Agree, Disagree and Strongly Disagree.

3.6 Validity of instrument

In order to ensure the validity of the instrument the researcher questionnaires was be subjected to both face and content validity which requires the instrument to be validated by Educational Technology two expert from the School of Science and Technology Education (SSTE), Federal University of Technology Minna, Niger State. The experts determine appropriateness, simplicity and clearity of the instrument to ascertained its validity.

3.7 Reliability of the instrument

The reliability of the research instrument was be determined through a pilot test by administering the instrument to 10 lecturers from the Department of Library and Information Technology (LIT), Federal University of Technology Minna, Niger State which was not among the sampled departments for the study, but constitue part of the study population a reliability co-efficient of 0.67 was be established for the instrument using Pearson product moment.

3.8 Method of data collection

The researcher obtained permission from the relevant heads of departments, the data was collected personally using the research instrument. The questionnaires were administered to the lecturers in each of the departments. The data are collected on due time from the respondents.

3.9 Method of Data Analysis

The statistical method used for the analysis of the data gathered from the administration of the instrument was simple percentage. The choice of the method of analysis was based on the fact that responses of the respondents varied from strongly agree, agree, disagree and strongly disagree. A total of thirty (30) questionnaires were administered and collected back, the frequencies of the response will also be analyzed.

CHAPTER FOUR

4.0 RESULT AND DISCUSSION

4.1 Result

This part presents the result of the analyses on lecturers' perception, self-efficacy, and interest towards virtual reality.

Research Question 1: What is the perception of lecturers on the utilization of virtual reality at the Federal University of Technology Minna?

Table 1: Perception of lecturers on the utilization of virtual reality

S/N	Items	N	Mean	Std
1	The use of virtual reality technology in FUTMinna is prominent	30	3.30	0.46
2	I can make use of virtual reality technology	30	3.13	0.68
3	Virtual reality technology is used by students in FUTMinna	30	3.06	1.04
4	Virtual reality technology is used alongside lecture method	30	3.40	0.67
5	Virtual reality can enhance academic performance of students	30	3.30	0.46
6	Virtual reality can make the learning interesting when used	30	3.30	0.46
7	Virtual reality increases productivity	30	3.00	1.20
8	The use of virtual reality encourage collaboration	30	3.20	1.09
	Grand mean	30	3.21	

The study evaluated the perception of lecturers towards virtual reality by analysing their responses to a set of questions, as presented in Table 1. The table displays the mean and standard deviation of the responses provided by the participants, reflecting their perceptions of virtual reality. The findings suggest that the lecturers have a generally positive perception of virtual reality. Each of the eight items in Table 1 received a mean score above the grand mean value of

2.50, indicating a positive perception towards virtual reality. Furthermore, the overall mean score of 3.21 (which is greater than 2.50) reinforces the notion that the lecturers have a favourable attitude towards virtual reality. Based on the responses collected from the sample, the study concludes that lecturers possess a positive perception towards virtual reality.

Research Question 2: What is the self-efficacy of lecturers on the utilization of virtual reality at the Federal University of technology Minna?

Table 2: self-efficacy of lecturers on the utilization of virtual reality

S/N	Items	N	Mean	Std
1	I am able to use virtual reality headsets and computers	30	3.40	0.72
2	I can make use of virtual reality technology while teaching	30	3.13	0.81
3	I able to use virtual reality laboratories	30	3.40	0.67
4	I can make use of Virtual reality technologies is used alongside lecture method	30	3.30	0.46
5	The use of virtual reality can enrich students learning	30	3.30	0.46
	Grand mean		**3.30**	

In order to determine the self-efficacy of lecturers on the utilization of virtual reality technology, the researchers conducted an assessment based on specific items listed in Table 2. The table provides the mean and standard deviation for each item, which allowed the researchers to analyse the lecturers' perceptions of virtual reality. Upon analyzing the data, it was found that the lecturers showed a high level of self-efficacy towards virtual reality, with each item scoring above the minimum criterion mean of 2.50. This means that the lecturers were self-efficient in

their ability to use virtual reality technology effectively. Moreover, the grand mean of 3.30 (which is above the minimum criterion) indicates that the lecturers have a positive perception of virtual reality technology as a whole. This means that they view virtual reality as a valuable tool for enhancing the teaching and learning experience. Overall, the findings suggest that lecturers have a self-efficacy towards virtual reality technology and are confident in their ability to use it effectively, which can have a significant impact on the integration of virtual reality into educational settings.

Research Question 3: What is the interest of lecturers on the utilization of virtual reality at the Federal University of technology Minna?

Table 3: Interest of lecturers on the utilization of virtual reality

S/N	Items	N	Mean	Std
1	I have keen interest in using virtual reality technologies	30	3.00	1.20
2	I always opt for virtual reality when teaching	30	3.60	0.67
3	I always insist on virtual environment as part of the learning experiences	30	3.30	0.46
	Grand mean		**3.30**	

The assessment of lecturers' interest in virtual reality was based on the items presented in Table 3, which displays the mean and standard deviation of their responses. The results indicate that lecturers demonstrated an interest in utilizing virtual reality, as the mean scores for each item (1-3) were above the criterion mean of 2.50. Moreover, the grand mean of 3.30 ($x>2.50$) suggests that lecturers had a favourable perception of virtual reality. In summary, the findings suggest that lecturers showed interest towards the potential use of virtual reality in their teaching or learning practices.

4.2 Discussion of Findings

The study investigated lecturers' perception, self-efficacy, and interest towards the use of virtual reality in their teaching. The analysis of the data revealed three key findings.

Firstly, the analysis found that lecturers held a positive perception towards virtual reality. This means that lecturers viewed virtual reality as a useful tool in teaching and learning and were likely to incorporate it into their teaching practices. The grand mean score of 3.21, which was above the established decision mean of 2.50, indicates a high level of agreement among the lecturers on the usefulness of virtual reality. This finding is in line with the findings of Wells and Miller (2020) who revealed that teachers generally held favorable opinions about VR technology.

Secondly, the analysis revealed that lecturers were self-efficient towards the use of virtual reality. This means that lecturers felt confident in their ability to use virtual reality in their teaching practices. The grand mean score of 3.30, which was also above the decision mean of 2.50, suggests that the lecturers were self- efficient in their ability to use virtual reality, despite any challenges or barriers that may arise. This in line with the findings of Nissim and Weissblueth (2017) who revealed that virtual reality increase teacher’s self-efficacy and allowed them to be more innovative and creative.

Lastly, the analysis found that lecturers showed interest towards the use of virtual reality. This means that lecturers were willing and eager to explore the use of virtual reality in their teaching practices. The grand mean score of 3.30 indicates a high level of interest among the lecturers towards virtual reality. This finding is in line with the findings of Wells and Miller (2020);

Breiki *et al.,* (2022) who revealed that teachers displayed interest and readiness towards the utilization of virtual reality.

Overall, the findings suggest that lecturers are positive, self-efficient, and interested in the use of virtual reality in their teaching practices. These findings have implications for the integration of virtual reality in teaching and learning, as they suggest that lecturers are likely to embrace the use of this technology and integrate it into their teaching practices.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.0 SUMMARY

In this chapter, the summary on perception, self-efficacy and interest towards utilization of virtual reality learning among lecturers of Federal university of technology Minna Niger state was presented. Among others, the chapter includes the conclusion and recommendations based on the findings.

5.1 CONCLUSION

Based on the findings of this study, it was concluded that:

Lecturers showed favourable perception towards the use of virtual reality, their perception towards virtual reality will further boost the utilization and maximize efficiency in teaching and learning, the self-efficacy level towards virtual reality was high and indicated that lecturers were willingly to use virtual reality to accomplish tasks relating to teaching and learning. The interest showed by lecturers towards virtual reality will definitely translate to the utilization of virtual reality.

5.2 RECOMMENDATIONS

Based on the findings in this study, it was recommended that:

1. The Federal ministry of education should provide virtual reality technologies in all the Federal Universities in Nigeria.

2. The already existing infrastructure should be maintained and properly stored after usage to safeguard and prevent them from damaging.
3. Inspectors and supervisors should ensure regular supervision to enhance the effective use of virtual reality and resources in the teaching and learning.
4. The government and relevant stakeholders in education should make funds available for buying needed virtual reality for teaching and learning.

5.3 Major Findings of the Study

The following findings have been made from the research work

1. Lecturers held positive perception towards the utilization of virtual technology at the Federal University of Technology, Minna
2. Lecturers has self-efficacy towards the utilization of virtual technology at the Federal University of Technology, Minna
3. Lecturers has interest towards the utilization of virtual technology at the Federal University of Technology, Minna

5.4 CONTRIBUTION TO KNOWLEDGE

Based on the findings of the study, the following are the contribution to knowledge:

1. The perception of lecturers towards virtual reality will further boost the utilization of virtual reality in tertiary institutions in Nigeria. This study will contribute to the body of existing literature on the perception of lecturers towards virtual reality.

2. Lecturers were self-efficient towards the utilization of virtual reality; this explains the importance of self-efficacy towards the utilization of virtual reality technologies in tertiary institutions in Nigeria.

3. The study revealed that lecturers were interested towards the utilization of virtual reality.

5.5 Implications of the Findings

The study revealed that lecturers have a positive perception of virtual reality and are interested in utilizing it in the teaching and learning process. Moreover, the study has also revealed that lecturers have a strong belief in their own abilities to use virtual reality, which is known as self-efficacy. This finding is significant as it suggests that lecturers have the potential to adopt and integrate virtual reality technology into their teaching practices effectively. Given the positive results of the study, it is recommended that lecturers be encouraged to explore and use virtual reality technology in their teaching. They should be further enlightened about the technology's potential benefits and given the necessary training to integrate it into their teaching practices. In addition, the technology should be made readily available for use in the classroom. Using virtual reality technology can enhance the teaching and learning process by providing a more immersive and interactive experience for students. It can be used to create virtual simulations, which can help students to visualize and understand complex concepts better. Moreover, it can provide a more engaging and dynamic learning experience, which can help to increase students' motivation and interest in learning.

Overall, the study's findings suggest that the use of virtual reality technology in education has the potential to improve the quality of teaching and learning. Therefore, it is essential to encourage

and support lecturers in adopting and integrating this technology into their teaching practices to realize its full potential.

5.6 RECOMMENDATIONS FOR FURTHER RESEARCH

1. Further research should be carried out to examine the availability and utilization of virtual reality technologies in tertiary institutions in North-Central Nigeria.

2. Studies should be carried out on effect of virtual reality on the academic achievement, retention, and interest of educational technology students in tertiary education.

3. A similar research study could be carried out in South-western universities.

4. A study on the economic factors affecting the selection of virtual technologies for teaching and learning in North-central Nigeria.

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