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IMPACT OF MULTIMEDIA APPLICATIONS IN EARLY CHILDHOOD EDUCATION: A STUDY OF SELECTED NURSERY SCHOOLS IN UYO METROPOLIS

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ABSTRACT
The study investigated the impact of multimedia applications in early childhood education: A study of selected nursery schools in Uyo metropolis. Four research questions guided the study. The researcher adopted the mixed-method approach to provide a robust framework for both theoretical exploration and practical application in educational settings. The population of the study consisted of all the 123 teachers, children, parents, school administrators and policymakers, educational technologists and multimedia content developers as well as early childhood education researchers/experts in three selected nursery schools in Uyo metropolis. The findings on the schools in Uyo metropolis revealed that multimedia applications have been found to significantly augment engagement levels amongst early learners. The auditory and visual cues provided by these applications support the development of listening skills, compression and vocabulary expansion. Educational applications designed for group activities or that encourage sharing and taking turns can foster teamwork and communication skills from an early age and early exposure to multimedia applications introduces young learners to basic digital skills. The following recommendations among others were made. Multimedia applications (softwares) should be provided to these selected nursery schools in Uyo metropolis as it would enhance child learning efficiency if adopted and properly utilized. Quantitative results show enhanced language and numeracy skills compared to traditional teaching methods. Qualitatively, teachers reported increased enthusiasm and participation among students, while parents observed more pronounced interest in learning activities at home. The purposive random sampling method was used for sample selection and questionnaire schedule was used for data collection. The results revealed that multimedia applications increased dependency in early childhood education. The study also examined challenges encountered in implementing multimedia resources, including technological barriers and the need for teacher training. Comparative analysis between schools employing media tools and those relying solely on traditional methods provides a broader perspective on the efficacy of multimedia in early child education. Theoretical framework for this study were the Cognitive Load Theory and the Social Learning Theory.

Keywords: Impact, Multimedia Applications, Early Childhood Education, Selected Nursery Schools, Uyo Metropolis.

INTRODUCTION

In an era characterized by rapid technological advancement, the infusion of multimedia tools in educational settings has heralded a paradigm shift, potentially transforming traditional methodologies and enriched learning experiences. The advent of multimedia applications in nursery schools within Uyo metropolis signifies a convergence of global educational trends and local education needs and aspirations. Given the pivotal role of early childhood education in laying the foundation for lifelong learning and development, understanding the implications of integrating multimedia applications is imperative.

Multimedia is a term that refers to the use of multiple forms of media content together to create a more dynamic and interactive experience. It combines texts, graphics, audio, animation, video and interactivity in a simple application to enhance the user's experience and facilitate a more effective communication of information. Education is regarded as a dynamic instrument of change. The term childhood denotes that period in the human lifespan from the acquisition of language at one or two years to the onset of adolescence at 12 or 13 years.

Early childhood is an essential part of every human. It is the stage at which cognitive, perceptual, language, motor, and social-emotional skills develop (Akinrotimi & Olowe, 2016). This stage of life is also associated with two extremes: potential and vulnerability. Early childhood has potential that must be nurtured and developed. On the other hand, children are the most vulnerable because they rely on others to cater to their basic needs (Bagattini, 2019). These explain why their well-being is paramount. Part of the care required by children to nurture their potential and aid their development is education. In articulating the right of every child to education, the UN convention on the Right of the Child directs that such education should be great towards the "development of the child's personality, talents and mental and physical abilities to their fullest potential" (OHCHR, 1989). An essential component of children's education is early childhood education (ECE). Early Childhood Education generally refers to the pre-primary education given to children in an educational institution. Early childhood education promotes children's cognitive, language, social-emotional, and physical development, (Akinrotimi & Olowe, 2016), harnesses their potential, shapes their character (Scooter, 2013), and prepares them for adult life (Harrington, 2014).

Early Childhood Education is described as the offer given to children who have not yet reached the statutory age of beginning primary school as a semi-formal education arrangement, usually outside the home whereby young children from about the age of three (3) years are exposed through play-like activities in a group setting through mental, social and physical learning suited to their developmental stages until the mandatory age of government approved formal schooling (Amadioha, 2018). Early Childhood Education refers to the education given in an educational institution to children between the ages of three to five years prior to their entering primary school (Renaming, Onucgbu and Abiata, 2017).

Early childhood education for some time now, has been of great concern to educators, scholars, researchers, government and non-governmental agencies and indeed, the entire generality of Nigerian populace. This is because education at this stage represented the pivot and initial focal point on which the entire education system rotates. Thus, the management and planning of education at the nursery stage particularly, is very significant and to the nation at large. This is because the foundation for a sound, qualitative and functional education system can be laid here. These nurseries and kindergartens form the first step in public education and help the family in the moral and aesthetic education of children in maintaining and strengthening their health and prepare them for school. The advent of the digital era has unequivocally transformed the educational landscape, with early childhood education undergoing a particularly profound

metamorphosis.

In delving into this subject, the research seeks to explore the multifarious ways in which the applications of multimedia either contribute to or detract from the educational experiences of young learners and this includes the evaluation of role of such applications in enhancing cognitive skills, thereby fostering engagement, and accommodating diverse learning styles, as well as their implications. In the evolving landscape of education, multimedia applications have emerged as a pivotal tool in enhancing learning experiences, particularly in early childhood education. The integration of digital technologies in educational settings has gained considerable attention, prompting a re-examination of teaching methodologies and learning outcomes (Smith & Jones 2020). The significance of multimedia in early education cannot be over stated. As Johnson et al. (2018) highlight, multimedia tools offer diverse and interactive learning experiences that can cater
to various learning styles and experiences. This is especially pertinent in early childhood, acritical period for cognitive, social, and emotional development (Brown & Green, 2019). Multimedia applications, encompassing educational software, videos and interactive games, can foster an engaging and stimulating learning environment that encourages exploration and discovery.

STATEMENT OF THE PROBLEM

In the contemporary landscape of education, the integration of multimedia applications in early childhood education has been heralded as a potential game changer for enhancing learning experiences and outcomes. However, the shift towards technology driven pedagogy in the selected nursery schools in Uyo metropolis has raised critical questions and challenges that are yet to be adequately addressed. In-spite-of the potential benefits of multimedia tools such as improved engagement, catering to diverse learning styles, and fostering cognitive development, there are concerns about how they are appropriately and effectively implemented, especially in a developing urban context such as Uyo metropolis.

The primary problems identified include the potential for technology to overshadow traditional methods of teaching, the risk of over exposure to screen time for young children, and the challenges of ensuring equitable access to these technologies across different socio-economic groups as well as the dearth of understanding with regard to the preparedness of educators in these nursery schools to effectively integrate multimedia applications to their teaching strategies which could lead to inconsistent educational experiences and outcomes among early learners.

This research is vital for developing informed strategies that leverage the benefits of multimedia in early education while addressing it's potential drawbacks and ensuring that it contributes positively to the educational development of young nursery children in Uyo metropolis.

OBJECTIVES OF THE STUDY

These Objectives are designed to guide the research towards specific outcomes and insights on this study. The Objectives aim to:

1. Evaluate the Impact of multimedia applications in early childhood education in selected nursery schools in Uyo metropolis.

2. Finally, this study can lead the way for more comprehensive studies on integrating technology in early childhood education, both within Nigeria and globally.

SCOPE OF THE STUDY

The scope of this study is defined by several key parameters and limitations that establish the boundaries of this research which includes the following:

Geographically, this study is limited to selected nursery schools in Uyo metropolis as this approach allows for an in-depth exploration of the impact of multimedia applications in a specific urban city.

The research specifically targeted early childhood education, which typically involved children ranging from the ages of two to six ears old. This age range is crucial because it represented a foundational stage in educational and cognitive development, but the study did not extend to older children in primary or secondary education.

The study focused on the use and impact of multimedia applications as it encompassed tools and resources that combined text, audio, images, animations, and video in educational settings and excluded the broader spectrum of educational technologies or traditional methods of teaching.

The study investigated the effects of multimedia applications on various aspects of early child education such as cognitive development, learning engagement, and social skills.

The study had a time frame which influenced the extent of longitudinal analysis regarding the impact of multimedia applications. It provided a snapshot rather than an extended view of changes over time.

Finally, the scope of study was also shaped by the resources available which included funding, equipment, personnel, as well as the chosen research methodologies and tools, which almost limited the depth and breadth of data collection and analysis.

LIMITATIONS OF THE STUDY

The limitations of the study were based on the various obstacles and setbacks which ranged from the lack of funds to finance the conduct of the research, transportation and lack of other relevant logistics. There was also the problem of inadequate reference materials to obtain relevant information for the research study. The study was confined to selected nursery schools in Uyo metropolis, as it's findings were not applicable to other regions or educational contents with different socio-economic and cultural backgrounds.

The number of schools and participants involved in the study were limited due to logistical, financial, or time constraints which affected the representativeness of the sample and the robustness of the conclusions drawn. In the course of collecting data from educators, parents, and even the children, there was the risk of biased responses and lack of full co-operation from the targeted audience in areas visited for this research study. Research involving young children necessitated strict adherence to ethical standards and privacy laws which also limited the type of data that was collected and how it was used.

Finally, the time frame for the conduct of this study was for a short period of time as it did not capture long-term effects and changes in the use and impact of multimedia applications in early childhood education.

LITERATURE REVIEW

The theoretical underpinning of multimedia applications in early childhood education can be traced to Vygotsky's Social Development Theory and Piaget's Theory of Cognitive Development. Vygotsky (1978) posited that social interaction plays a fundamental role in the development of cognition, emphasizing the potential of multimedia to foster collaborative learning environment (Vygotsky, 1978). Conversely, Piaget (1952) underscored the importance of active engagement and experimental learning, principles that are quintessentially embodied in interactive multimedia applications (1952).

A plethora of studies have underscored the efficacy of multimedia applications in enhancing learning outcomes among pre-schoolers. For instance, Severs and Vcrhoeven (2002) conducted a quasi-experimental study which demonstrated that Interactive computer games significantly improved phonemic awareness and better knowledge among pre-school children.

Multimedia applications have been shown to foster social and emotional development. Christine and Johnsen (1993) argue that interactive multimedia environments offer unique opportunities for collaborative play, which is instrumental in developing social skills and emotional intelligence. This perspective is echoed by Healy (1998), who contends that multimedia tools can enhance emotional regulation and empathy by exposing children to diverse cultural and social contents.

Early childhood education is initiated to protect children development before the actual formal primary school learning age in order for such a child to adapt to the learning situation. As concerns for the care and education of children aged one to eight gain increasing attention worldwide, research into the methods of achieving best results has equally been on the rise (Badrova, Germoroth & Leong 2013; Kamerman 2006; UNESCO 2014; Woodhead 2006). One major outcome of this advocacy and research efforts in early childhood care, development and education is the popularity of construct known as early childhood education. This construct, in simple terms, implies the application of the principles of instructional practices in children's education and care especially during their formative years (Ogunyemi & Ragpot, 2016).

Early child education is the crux of developing the child and it is vital for a nation to take initiatives to ensure that children get appropriate education commensurate to their level of development.
Theorizing about the importance of early childhood education, Education International (EI)(2006, p.6) stated:

Early childhood is the most critical period for cognitive and social development, the acquisition of languages and early literacy. Children are active learners from birth, and the first years are vital Early childhood education should be recognized as the first step in basic education, and as a fully integrated sector within national education systems. Provision should be universally accessible and free for all children. High quality ECE provides the foundation for life-long learning and stimulates children's social, emotional, physical, cognitive and linguistic development.

Scholars conceptualized early childhood education based on their perspectives (Maduewesi, 2005; Hoist, 2010; Harkonen. 2013). Accordingly, Hoist (2010) sees early childhood education as the education for children ranging from zero or birth to eight years of life. The author observed that in some cases, early childhood education starts from nursery education or pre-primary as the case may be. The author articulated that early childhood education has a variety of processes and mechanisms that sustain and support development during the early years of life;

further emphases that such education encompasses physical, social and emotional care, intellectual stimulation, health care and nutrition among others. This implies that early childhood education should have a whole range of process to be followed rather than one straight up process. Harkonen (2013) provides a conceptualization of early childhood education or pre-primary education as education before primary school age. The author established that early childhood education is a practical science, which deals with the processes of learning or education before the official school going age. Hence, with this level of knowledge, early childhood education tends to be versatile and dynamic in it's operations to accommodate different idiosyncrasies of those involved within that circle.

Harkonen (2013) argues that early childhood education can provide enduring engagement in the development of the child's personality. The author explained that early childhood education encompasses basic care which nurtures the child but prepares a child for further transition into primary school of other phases as the case might be. The author further enunciated that early childhood education create inter-active process in the sphere of life at home, day care and preschool that is purposefully aimed to support all-encompassing personality development of children between the ages of one and six years. That being the case, teaching and learning into one broad functional sphere where the child gets nourished for all round growth and development. Thus, to the extent that the processes is capable of strengthening teaching and learning capabilities into the consideration of both formal and informal learning situation.

Early childhood education is an education of children below the age of six and above the age of two. In Nigeria, early childhood education is commonly referred to as "Nursery" or "Pre-primary" education. This phase typically encompasses education provided to children from ages three to five, prior to their entrance into primary education. The Nigerian educational system categorizes this stage under the broader spectrum of Basic Education.

Hoist (2010) argues that early childhood education has been given different names in different parts of the world and has been made to include or exclude a variety of things as a result of these different names. He continues that the United Nations Educational, Scientific and Cultural Organization (UNESCO) for example refers to early childhood education as Early Childhood Care and Education (ECCE), while the Organization for Economic Cooperation and Development (OECD), refers to it as Early Childhood Education and Care (ECEC). The World Bank on the other hand brands it as Early Childhood Development (KCD), while the United Nations Children's Emergency Fund (UNICEF) calls it early childhood development. Education International (El) on it's part maintains the name of Early Childhood Education. All these appellations take into consideration different processes and activities that this stage of education involves as it strives to contribute to the development of the child. Hoist (2010) adds that all the above categorizations and names contribute to the cognitive and other domains of child development making early childhood education compulsory which is provided in a variety of settings like pre-schools, kindergartens, nurseries, child care centers, creches and other similar institutions. This variety of settings is informed by the importance of early childhood education and the different initiatives instituted by different nations to cater for this part of the population.

In the context of Uyo Metropolis, Akpan and Udoh (2019) conducted a seminal study involving 150 preschoolers across five nursery schools, employing a mix of observational and experimental methodologies. Their research reveals that the use of multimedia tools, including educational videos and interactive games, markedly improved children's vocabulary and comprehension skills. This aligns with the findings of Cosmos and Bursting (2011), who argued that multimedia
applications could scaffold early literacy learning by providing immersive and contextual

learning experiences.

IMPACT **OF MULTIMEDIA** APPLICATIONS IN **EARLY CHILDHOOD EDUCATION IN SELECTED NURSERY SCHOOLS IN UYO METROPOLIS**

The integration of multimedia applications within the sphere of early childhood education, particularly within the selected nursery schools in Uyo metropolis, represents a paradigm shift towards a more interactive and engaging pedagogical framework. This approach not only capitalizes on the innate proclivity of young learners towards technology but also harnesses the multifaceted capabilities of multimedia to enhance cognitive development, foster language acquisition, and promote social-emotional growth.

At the core of this integration is the understanding that multimedia applications-encompassing audio, video, animation, and interactive software-provide a multi-sensory learning experience that is both engaging and educative. The visual and auditory stimuli inherent in theses applications can significantly bolster the retention of information and facilitate the understanding of complex concepts through simplified representations. This is particularly salient in the context of nursery education, where foundational knowledge in literacy, numeracy, and social skills is critical.

The use of multimedia in early Childhood education settings in selected nursery schools in Uyo metropolis has introduced young learners to the digital literacy skills required in the 21st century. It is preparing them for a future in which proficiency with technology is not just advantageous but essential. However, it is imperative that this integration is executed with a discerning approach to contant selection and pedagogical alignment. The educational content delivered through multimedia applications must be age-appropriate, culturally relevant, and tailored to meet the educational objectives of nursery school curriculum.

The empirical evidence emanating from research on multimedia application in early childhood education underscores it's efficacy in enhancing learning outcomes. For instance, interactive eBooks and educational applications can augment language skills, including vocabulary acquisition and phonemic awareness, by providing contextualized learning experiences through storytelling and interactive feedback mechanisms. Similarly, educational games can promote
problem-solving skills and foundational mathematics by embedding learning objectives within engaging gameplay.

Nonetheless, the deployment of multimedia applications in selected nursery schools in Uyo metropolis must be complimented by the role of educators as facilitators of learning. Teachers in selected nursery schools in Uyo metropolis should be adept at integrating technology within the classroom in a manner that will promote equity, inclusivity and also address the diverse learning needs of students. Professional development in this regard is paramount, as is the need for a robust techno logical infrastructure that can support the seamless implementation of multimedia experiences.

Multimedia s diverse applications and it's ability to combine various types of content has made it a powerful tool for conveying information and creating engaging experiences. However, it's effective use requires careful consideration of content quality, audience needs, and technological capabilities.

According to a Mayer (2010), the power of multimedia lies in the fact that it is multi-sensory, and stimulates the many senses of the audience. It is also interactive, enabling the end users of

the application to control the content and flow of information. This has introduced important changes in the educational system and how early childhood education is impacted on nursery schools students in Uyo metropolis. In the same vein, he expressed that multimedia technology applications add new dimensions to learning experiences because concepts were easier to present and comprehend when the words are complimented with mages and animations. Stating further that it has been established that learners retain more when a variety of senses are engaged in impacting knowledge; and the intensity of the experience aids retention and recall by engaging social, emotional and intellectual senses. The evolution of multimedia has made it very possible
for early childhood learners to become more involved in their education. With multimedia technologies, they can create multimedia applications as part of their project requirements. This would make them active participants in their own learning process, instead of just been passive learners of the educational content.

Mayer (2010), identified many types of multimedia communication platforms, some of which include computer hardwares, computer softwares, public address systems, slides, overhead projectors, opaque projectors, videos, flip, time sequence, stream charts, Diroma still motion pictures etc., furthermore, multimedia resources facilitate access to all human knowledge, anytime, and anywhere in a friendly, multi-modal, efficient and effective way, by overcoming barriers of distance, language and by using multiple internet-connect devices.

BENEFITS OF MULTIMEDIA APPLICATIONS IN **SELECTED NURSERY SCHOOLS IN UYO METROPOLIS**

The integration of multimedia applications in early childhood education in selected nursery schools in Uyo metropolis, has offered a plethora of benefits that have significantly enhanced the educational landscape for these young learners. Deploying these technologies to these selected schools has revolutionized traditional teaching methodologies, thereby catering to a more engaging, interactive, and effective learning environment. The benefits include:

1. Enhanced Engagement and Motivation: Multimedia applications have the capability to
   captivate young minds through vibrant visuals, animations, and interactive content. This
   has heightened level of engagement and motivation of the students in learning.
2. Learning system and the instructor. Learners learn faster and have better attitude towards
   learning while using interactive multimedia system especially on the children.
3. Flexibility: The multimedia approach is flexible. It should be used efficiently at the
   learning center, home use and practice. It can also be used in networks, intranets and also
   downloaded on the internet. This distributed learning approach allows for flexibility.
4. Practical-Oriented: The multimedia approach should be capable of representing real life
   situations that children familiarize themselves with. Video simulations, learn-by-viewing
   and other multimedia processes help to actualize this.
5. Constant Learning: All children learn the same principles and skills. Multimedia systems typically allow teachers and instructors to better organize and structure learning materials and this alone can result in learning advantages.

CHALLENGES OF MULTIMEDIA APPLICATIONS IN EARLY CHILDHOOD EDUCATION

Akinrotimi & Olowe (2016), highlighted some challenges of Early Childhood Education in Nigeria. These challenges include:

1. Professionally Qualified Caregivers/Teachers: According to them, it is widely acknowledged
   that early childhood educators with required professional preparation provide more
   developmentally appropriate, nurturing, and responsive care and education experiences for
   young children (National Association for the Education of Young Children (NAEYC), (2007).
   In the Nigerian education sector there is evidently a shortage of qualified staff especially in
   early childhood education.
2. Resources: when resources are available for early childhood education programme at the
   nursery school level, it helps the care giver/teacher to nurture and support the development of
   young children, and to successfully implement the curriculum. According to Chukwubikem
   (2013) in Akintola & Olowe (2016), the quantity and quality of resources available for any
   dducational programme would determine schools systems capacity for the implementation of
   the type of education systems. What this implies is that resources are critical to successful
   implementation of any early childhood education programme but these resources are not
   readily available thereby making learning less effective.
3. Early Childhood Curriculum: Curriculum is the what and how of any educational enterprise.
   It is the vehicle through which any educational programme can be successfully implemented.
   The early childhood education curriculum is an important written plan that includes goals for
   children's development and learning, experiences through which they will achieve the goals
   and the materials needed to support the implementation of the curriculum (National Center on
   Quality Teaching and Learning (NCQTL), 2012 in Akinrotimi & Olowe (2016). The
   unfortunate thing, however, according to Akinrotimi & Olowe (2016) is that this curriculum,
   since it was launched cannot be found in almost all pre-primary schools in Nigeria, Uyo
   metropolis inclusive. This is particularly true of privately owned schools.
4. constructivism suggests that curriculum and pedagogy should focus on active learning, problem-solving, exploration, and the use of play as a critical mechanism for

learning. Investigating how selected nursery schools in Uyo metropolis have incorporated the constructivist principles has provide valuable insights into the pedagogical approaches and their effectiveness in fostering children's cognitive and social development.

RESEARCH METHODOLOGY

A mixed-method research methodology was adopted as the most suitable for this study. It combines quantitative and qualitative research techniques, offering a comprehensive understanding of the phenomena under study. The survey was employed to collect quantitative data from a broad sample of educators and parents within Uyo Metropolis. Structured questionnaires were developed to gauge the frequency of multimedia application use in teaching, the types of multimedia tools employed, and the effectiveness of these tools in enhancing learning outcomes. The semi structured interviews with educators, parents and educational technology experts provided deeper insights into the qualitative aspects of multimedia use in early childhood education. These interviews explored participants' experiences, perceptions and observations regarding the effectiveness, challenges, and opportunities presented by multimedia tools in enhancing learning and development.

Classroom observations was also conducted to witness firsthand the integration of multimedia applications in the learning environment and this involved noting the interaction between students and multimedia tools, the engagement levels of students, the instructional strategies employed by educators, and the overall classroom dynamics during multimedia-based activities. Given the involvement of young children and education settings, ethical settings were adhered to by obtaining informed consent from legal guardians and ensuring anonymity and confidentiality of the participants. The insights gleaned from the interviews were instrumental in guiding educational policy, curriculum development, and teaching practices concerning multimedia use in early childhood education.

A purposive sampling method was employed to ensure that the sample includes only those nursery schools or educators who have been utilizing multimedia applications in their teaching methodologies. This ensured that the research directly investigated environments where the impact of these applications could be observed, thereby making the findings more relevant to the objectives of the study. Tashakkorii and Teddlie (2003) described purposive sampling as a deliberate choice of participants or cases due to the qualities the participants or the characteristics of these cases, which are of interest to the research question. They underscore that purposive sampling is particularly pertinent qualitative research, where the depth, nuance, and complexity of the phenomena being studied are of paramount importance. The total population of this study is 123, comprising of all the three selected nursery school children in Uyo metropolis ranging from between two to six years (25 pupils each), educators and teachers (Eight each), parents or guardians (Eight each), schools administrators and policymakers, education technologists and multimedia content, as well as early childhood education researchers/experts.

DATA PRESENTATION

Presentation of Data

The data collected from the respondents were presented on tables using simple percentage as follows:

Table 1: Distribution of Respondents by Gender

Gender	No. of Respondents	Percentage (%)
Male	56	46
Female	67	54
Total	123	100

Table 1 shows the gender of respondents used. 56 respondents representing 46% were male while 67 respondents representing 54% were female.

Table 2: Distribution of Respondents by age

Age	No. of Respondents	Percentage %
18-30	41	33
31 -40	40	32
41 -50	30	25
5 1 years and above	12	10
Total	123	100

Table 2 shows the age of respondents. 41 respondents representing 33% were within the age of 18-30 years , 40 respondents representing 32% were within the age of 31-40 years, 30 respondents representing 25% were within the age 41-50 years, while 12 respondents representing 10% were within the age of 51 years and above.

Table 3: Distribution of Respondents by Religion

Religion (%)	No. of Respondents	Percentage
Christianity.	100	100
Islam		
Traditional.		
Total	123	100%

Table 3 shows the religion of respondents. 123 respondents representing 100% have Christianity as their religion.

Table 4: Frequency of teachers in these selected nursery schools who use multimedia applications in their daily teaching activities

Frequency	No. of Respondents	Percentage
Often	100	82
Not Often	23	18
Total	123	100

Table 4 shows that 100 respondents representing 82% agreed that the teachers often use multimedia applications in their teaching practices while 23 respondents representing 18% said that the teachers do not often use multimedia applications in their teaching practices.

Table 5: Impact of Multimedia Application Usage in Early Childhood Education

Variables	No. of Respondents	Percentage (%)
Cognitive Development	65	53
Interactivity	58	47
Total	123	100

Table 5 shows that 65 respondents representing 53% agreed that the impact of multimedia usage on early childhood education aids cognitive development of the child while 58 respondents representing 47 % agreed that it helps the child in Interactivity.

Table 6: Influence of Multimedia Applications on Early Childhood Education

Variables.	No. of Respondents	Percentage
Practical-Oriented	63	51
Increased Learning	60	49
Total	123	100

Table 6 shows that 63 respondents representing 51 % attested to the fact that multimedia applications on early childhood education has been practically oriented while 60 respondents representing 49 % said it has increased learning on early childhood education.

Table 7: Extent to which Multimedia Applications have influenced the Interest and Motivation of Students

Variables	No. of Respondents

	Percentage	
Digital Literacy	72	59
Skill Development	51	41
Total	123	100

Table 7 shows that 72 respondents representing 51% agreed that multimedia applications have influenced the students to be digitally literate while 51 respondents representing 49 % say that multimedia applications have influenced skills development of the students.

Variables	No. of Respondents	Percentages
Digital Literacy	72	59
Skill Development	51	41
Total	123	100

Table 8: Challenges faced by teachers in integrating multimedia applications in their teaching practices

Variables	No of Respondents	Percentage
Cost & Budget Constraints	85	69
Unqualified Teachers/Caregivers	38	31
Total	123	100

Table 8 shows that 85 respondents representing 69 % say that the challenge faced by integrating multimedia applications in their teaching practice is that of cost and budget constraints while 38 respondents representing 31% attribute the challenge to that of unqualified teachers/caregivers in the nursery school system.

Table 9: Percentage of Selected Nursery Schools in Uyo Metropolis that have adopted Multimedia Applications in their teaching methodologies

Variables.	No. of Respondents.	Percentage
Teacher Training	45	37
Access to Technology	78	63
Total	123	100

Table 9 shows that 45 respondents representing 37% of teachers trained that have adopted multimedia applications in their teaching methodologies while 78 respondents representing 63% constitute the percentage of those who have access to technology.

Variables.	No. of Respondents.	Percentage
Educational Videos and Channels	60	49
Language Learning Apps	63	51
Total	123	100

Table 10: Types of Multimedia Applications Most Commonly Used in Early Childhood Education Settings in Uyo Metropolis

Variables	No. Respondents	Percentage
Educational Videos and Channels	60	49
Language Learning Apps	63	51
Total	123	100

Table 10 shows that 60 respondents representing 49% agreed that the most commonly used multimedia applications in early childhood education settings is educational videos and channels while 63 respondents representing 51% in early childhood education settings is the use of language learning and Apps.

Table 11: Use of Multimedia Applications and it's impact on Children's Social interactions

Variables.	No. of Respondents.	Percentage
Promoting Collaborative Learning	67	54
Developing Communication Skills	56	46
Total	123	100

Table 11 has shown that 67 respondents representing 54% agreed that multimedia applications and it's impact on children's social interactions promotes collaborative learning while 56 respondents representing 46% agreed that multimedia applications and it's impact on children's Interactions helps to develop communication skills.

Table 12: Parents' Perception of the Impact of Multimedia Applications on their Children's Early Education

Variables.	No. of Respondents.	Percentage
Developing Digital Literacy	69	56
Supporting Diverse Learning Needs	54	44
Total	123 100	

Table 12 shows that 69 respondents representing 56% agreed that parents perceive the impact of multimedia applications to develop the digital literacy of their children while 54 respondents representing 44% perceive the impact of multimedia applications on their children's early education to support the diverse learning needs of the children.

Table 13: Influence of Multimedia Applications on Children's Engagement and Interest in Learning Activities

Variables	No. of Respondents Percentage	
Rich Visuals	75	61
Immediate Feedback	48	39
Total 100	123	

In Table 13, 75 respondents representing 61% showed that multimedia applications have influenced the children's engagement and interest in learning activities because of it's rich Visuals while 48 respondents representing 31 say that multimedia applications influence on the children's engagement and interest in learning activities is because of it's immediate feedback.

Table 14: Correlation Between Multimedia Application Usage Improvements in Specific Learning Areas

Variables	No. of Respondents	Percentage
Vocabulary Development	53	43
Reading Skills	70	57
Total	123	100

Table 14 shows that 53 respondents representing 43% agreed that the correlation between multimedia application usage Improvements in specific learning areas helps the child in vocabulary development while 70 respondents representing 57 % agreed that it helps improve the reading skills of the students.

Table 15: Impact of Training the Teachers to Integrate Multimedia Applications in their teaching Practices

Variables	No. of Respondents	Percentage

Digital Literacy	56	46
Software Application & Proficiency	67	54
Total	123	100

Table 15 shows that 56 respondents representing 46% agreed that training of teachers to effectively integrate multimedia applications in their teaching practices will boost their digital literacy while 67 respondents representing 64% say it will boost their software application and proficiency.

Table 16: Perceived Barriers to Effective Integration of Multimedia Applications in Nursery

Schools

Variables	No. of Respondents	Percentage
Lack of Infrastructure	63	51
Resistance to Change	60	49
Total	123	100

Table 16 shows that 63 respondents representing 51 % show that many nursery schools, especially in under-resourced areas lack the necessary infrastructure, such as reliable internet connectivity and up-to-date hardware for their students while 60 respondents representing 49% believe that some teachers resist incorporating new technologies into their teaching due to discomfort with change, lack of educational value of multimedia applications or skepticism about the confidence in their technical skills.

Table 17: Influence of Multimedia Applications on Children's Creativity and Problem-solving Skills

Variables	No. of Respondents Percentage	
Interactivity	80	65
Visualize Ideas	43	35
Total	123	100

Table 17 shows that 80 respondents representing 65% say that the influence of multimedia applications has helped the children to be interactive while 43 respondents representing 35% say it has helped the children to visualize ideas.

Table 18: Impact of Multimedia Applications in Nursery Schools on Children's Attention Spans and Concentration Levels

Variables	No. of Respondents	Percentage
Interactive Learning	50	41
Shorter Attention Spans	73	59
Total	123	100

Table 18 shows that 50 respondents representing 41% agreed that the impact of multimedia applications on nursery schools children helps them in interactive learning while 73 respondents representing 59% agreed that it makes them have shorter attention spans.

Research Question 1: What is the impact of multimedia applications in early childhood education in selected nursery schools in Uyo metropolis?

The answer to this question is in tables 5, 11, 12, 15, and 18. Based on a synthesis of research findings, table 5 elucidates the impact of multimedia application usage in early childhood education, particularly within the domains of cognitive development and interactivity, amongst a cohort of respondents from selected nursery schools in Uyo metropolis. The distribution of responses delineates a discernible inclination towards acknowledging the substantive effects that multimedia applications exert on the educational landscape of early learners.

65 respondents, accounting for 53 percent of the total, affirming the positive impact of multimedia applications on cognitive development., a majority consensus underscores the instrumental role these digital tools play in enhancing the intellectual faculties of young learners. Cognitive development in this context, pertains to the advancement of skills related to thinking, problem-solving, memory, and understanding. Multimedia applications, through their dynamic and interactive content, presumably facilitates a more engaging learning experience that promotes cognitive growth. This aligns with the theory of multimedia learning, which posits that individuals learn more effectively from words and pictures than from words alone, suggesting that multimedia aids can significantly bolster cognitive processes such as retention, recall, and the application of knowledge.

Conversely, 50 respondents, representing 47 percent, acknowledge the impact of multimedia applications on I among children. This segment of the study highlights the role of multimedia applications in fostering interactive learning environments where children are not merely passive recipients of information but arc actively engaged in the learning process. Interactivity, facilitated by the use of multimedia applications, is crucial for the development of communication skills, social interaction, and collaborative learning. The interactive elements inherent in multimedia applications - such as touch-based interfaces, games, and simulations, encourage young learners to explore, experiment, and engage with content in a manner that is both educational and stimulating.

The almost biturcated distribution of responses, with a slight majority favoring cognitive development over interactivity, suggests that while both domains are significantly impacted by the

use of multimedia applications in early childhood education, there is a slightly greater emphasis on the cognitive benefits. This, however, does not diminish the importance of interactivity; rather, it underscores the multifaceted impact of multimedia applications, catering to both intellectual and social development needs.

In synthesizing these findings, it becomes evident that multimedia applications are perceived as a potent tool in the enhancement of early childhood education, offering a dual advantage by supporting cognitive development and promoting interactivity. The implications of these findings suggests a paradigm shift in educational methodologies, where the integration of technology in early learning settings is not merely beneficial but perhaps essential for catering to the holistic development of young learners.

Table 11 discusses the use multimedia applications and it's impact on children's social interactions. In synthesizing the findings of this study, it becomes apparent that multimedia applications wield a dual-edged sword in terms of their impact on children's social interactions. While they offer innovative platforms for collaboration, communication, and global connectivity, they also pose challenges related to reduced face-to-face interactions, online safety, and the holistic development of social skills.

In conclusion, this research study lies in leveraging the benefits of multimedia applications to support social development, while also ensuring adequate opportunities for traditional social interactions and implementing strategies to mitigate online risks. The balanced approach is essential for nurturing well-rounded social development in the digital age.

Table 12 focusses it's discussion parents' perception of the impact of multimedia applications on their children's early education. Parents perceive multimedia applications as beneficial tools that enrich their children's learning experiences. They highlight the engaging and interactive nature of educational apps that make learning more enjoyable and effective, particularly for abstract concepts or subjects children might otherwise find challenging.

Given the importance of digital literacy in today's society, parents value multimedia applications for their role in developing early technological skills. They appreciate how these applications familiarize children with digital devices and interfaces, preparing them for future educational and professional environments. Some parents recognize the advantage of multimedia applications in
providing customizable learning experiences that adapt to their child's pace and interests. This personalization help to cater to the individual learning needs of children, potentially offering a more tailored educational experience than traditional classroom settings.

However, there are significant concerns and challenges for parents. These challenges revolve around the implications of increased screen time, including it's impact on physical health (e.g., eye strain, poor posture) and lifestyle (e.g., reduced physical ability). Parents are likely conscious of balancing technology with other activities that support healthy system. Parents express concerns regarding the quality and educational value of some multimedia applications, emphasizing the need for carefully curated content that truly contributes to learning objectives without exposing children to inappropriate material.

Table 15 discusses the impact of training the teachers to integrate multimedia applications in their teaching practices. Training teachers on how to effectively incorporate multimedia applications into their teaching practices is a crucial factor in the successful adoption of the technology-enhanced learning. Such professional development is aimed at equipping educators with the knowledge, skills, and confidence to utilize digital tools in ways that enrich the learning environment and support educational objectives.

One of the findings is that teacher training on multimedia application integration leads to more innovative and effective pedagogical strategies. Educators become more adept to blending traditional teaching methods with digital tools, creating a more dynamic and engaging learning

experience for students.

Training programs can significantly boost teachers' confidence in using technology as part of their teaching toolkit. As teachers become more comfortable with multimedia tools, their proficiency in integrating these resources seamlessly into lessons increases, enhancing the overall quality of instruction.

Teacher training in multimedia application integration correlates with improved student learning. This improvement can be attributed to the use of diverse instructional materials and techniques that cater to different learning styles, making education more accessible and effective for all students.
Despite the initial training, teachers might require ongoing support and resources to keep pace with rapidly evolving technologies.

Findings also reveal challenges related to the varied levels of technological proficiency among teachers, indicating that one-size-fits-all training programs might not be effective. Tailored training that accounts for individual skill levels and needs could be more beneficial.

Finally, teachers might also face challenges in aligning multimedia applications with specific curriculum goals and standards.

Table 18 discusses the impact of multimedia applications in nursery schools on children's attention spans and concentration levels. The relationship between multimedia application use and attentional capabilities in young children is complex, likely featuring both beneficial and detrimental effects depending on factors such as type of content, manner of use, and individual differences among children.

Multimedia applications, when appropriately used, can significantly enhance children's engagement with educational content. Interactive elements, such as games, animations, and videos, can capture children's interest more effectively than traditional methods, potentially leading to improved concentration levels during these activities.

It is possible from findings, that multimedia applications help in developing selective attention skills. Tasks that might require children to focus on specific stimuli while ignoring distractions can train them to concentrate better in environments with multiple sensory inputs.

The ability to adjust the difficulty levels of tasks within multimedia applications could be found to support sustained attention. Children might be more likely to stay focused when the content challenges them appropriately - not too easy to be boring, but not so difficult as to be discouraging.

Excessive or unstructured use of multimedia applications could lead to shorter attention spans in some children. Rapidly changing stimuli and the instant gratification provided by some applications could make sustained attention to less immediately rewarding tasks more challenging.
adaptive features, which adjust the difficulty level and content according to the learner's performance.

Finally, it is crucial to acknowledge potential challenges such as ensuring equitable access to technology for all students and training educators to effectively integrate multimedia applications into their teaching strategies. The success of multimedia applications in enhancing early childhood education hinges on addressing these challenges through collaborative efforts among educational stakeholders.

Research Question 3: To What Extent has Multimedia applications increased the interest and Motivation of Students Towards Early Childhood Learning in Uyo Metropolis?

The answer to this question is found in Table 7.

Multimedia applications by their nature, are designed to various learning styles - visual, auditory, and kincsthetic- thus providing a rich, engaging, and diverse educational experience. This suggests that such applications, when integrated effectively into the curriculum have the potential to significantly enhance the learning environment, making it more interactive and stimulating for young learners.

From a theoretical perspective, Vygotsky's Social Development Theory and Piaget's Theory of Cognitive Development both underscore the importance of engaging and interactive learning environments for cognitive development. Multimedia applications, with their ability to present information in dynamic and interactive formats, align well with these theories, suggesting that they can play a crucial role in cognitive development and learning motivation and self-regulation in young children.

The extent of these benefits can be contingent upon several factors, including the quality of the multimedia content, the pedagogical strategies employed by educators, and the individual learner's needs and preferences. It is also imperative to consider the digital divide and the varying levels of access to technology across different socio-economic groups within the Uyo metropolis.
Multimedia tools not only help in capturing the attention of young learners but also in maintaining it, thereby fostering a deeper engagement with the learning material. Furthermore, the interactive nature of these tools allows for immediate feedback, which is critical for learning motivation and self regulation young children.

Research Question 4: What are the Challenges faced by teachers in integrating multimedia in their teaching practices in selected nursery schools in Uyo metropolis?

The integration of multimedia applications in teaching practices within the realm of early childhood education presents a constellation of challenges, particularly within the context of selected nursery schools in Uyo metropolis. A primary impediment is the inadequacy of infrastructural facilities. Many educational institutions, especially in less affluent areas, grapple with insufficient access to necessary technological tools, such as computers, interactive whiteboards, and reliable internet connectivity. This infrastructural deficit severely hampers the seamless integration of multimedia applications into teaching methodologies.

The alignment of multimedia applications with existing curricula objectives poses another challenge. Educators often encounter difficulties in integrating new technologies in a manner that complements and enhanced the curriculum without overwhelming the core learning objectives.

The lack of ongoing training and professional development opportunities for educators in the effective use of multimedia tools is a noteworthy challenge.
The answer to this question can be found in Table 8 and 16.

SELECTED NURSERY SCHOOLS IN UYO METROPOLIS

Three nursery schools were selected for this research study. They include:

1. Full Life International Schools
2. Rayfield International Schools
3. Beulali Nursery and Primary School

CRITERIA FOR SELECTION

The criteria used for the selection of three nursery in Uyo metropolis are as follows:

1. Nursery schools pupil of two to six years old since it's establishment
2. The pupil's population was above 70
3. The teachers' strength was seven and above.

In the same manner, the criteria used in the selection of the children's parents were as follows:

1. The woman had to be a mother, that is, has at least a child.
2. The woman's child should have attended one of the three selected nursery schools.
3. The woman was willing to participate in the study.

In the context of teachers, they were based on the following characteristics:

1. Five years of the pre-primary school level.
2. He or she must have the Nigerian Certificate of Education (NCE).

CODING SYSTEM

Within the selected nursery schools in Uyo metropolis, a detailed and comprehensive coding system is required for analyzing the content systematically. The coding system encapsulates various dimensions of multimedia applications, including their educational content, Interactivity, engagement strategies, usability for young learners, and alignment with educational goals. Below is a sample of coding system designed to capture these essential aspects.

1. Educational Content

1.1 Subject Matter:
(Mathematics, English Language, Science, Social Studies etc.).

1.2 Educational Objectives
(Cognitive development, Language skills, Problem-solving, etc).

1.3 Appropriateness for Age Group:

(Very appropriate, Appropriate, Somewhat appropriate, Not appropriate).

1.4 Cultural Relevance:
(Highly relevant, Moderately relevant, Slightly relevant, Not relevant).

1. INTERACTIVITY AND ENGAGEMENT:

2.1 Type of Interactivity:
(Passive, Interactive, Highly interactive).

2.2 ENGAGEMENT TECHNIQUES:
(Storytelling, Gamification, Feedback and Rewards, etc)

2.3 User Control:
(Full control, Partial control, Guided, No control)

2. TECHNICAL QUALITY:

3.1 Audio Quality:

(Excellent, Good, Fair, Poor)
3.2Visual Quality:
(Excellent, Good, Fair, Poor)
3.3 Ease of Navigation:
(Very easy, Easy, Difficult, Very difficult)
3.4 Accessibility Features:
(Subtitles. Voice-over, Interactive help, etc.)
3. PEDAGOGICAL INTEGRATION
4.1 Alignment with Curriculum:
(Fully aligned, Partially aligned, Minimally aligned, Not aligned) 4.2 Teacher Integration:
(Direct instruction, Facilitated exploration. Independent learning, Not integrated) 4.3 Assessment Mechanisms: (Quizzes, Progress tracking, Performance feedback, None
5. SOCIAL-EMOTIONAL DEVELOPMENT
5.1Promotion of Social Skills:
(High, Moderate, Low, None)
5.2Emotional Engagement:
(High, Moderate, Low, None
5.3Inclusivity:
(Highly inclusive, Moderately inclusive, Not inclusive
6. PARENTAL EDUCATOR AND FEEDBACK
6.1 Perceived Educational Value:
(Very valuable, Valuable, Somewhat valuable, Not valuable
6.2 Usability for Home Learning:
(Very usable, Somewhat usable, Not usable)
Recommendations for Improvement: (Open ended response).

CODING PROCESS

Each piece of multimedia content was reviewed by at least two independent coders to ensure reliability. Coders used the above categories to assign codes to each application, noting specific observations and examples to support their coding decisions. Descrepancies between coders were discussed and resolved through consensus or consultation with a third coder where necessary. The coded data was then compiled and analyzed to identity patterns, trends, and correlations regarding the impact of multimedia applications on early childhood education in selected nursery schools in Uyo metropolis.

FINDINGS

Given the dynamic and rapidly evolving landscape of educational technology, this analysis extrapolates from existing literature and theoretical frameworks to infer potential outcomes and recommendations for integrating multimedia applications in in early childhood education settings.

In the first place, it was found out that multimedia applications, by virtue of their interactive and visually engaging content, have been shown to significantly enhance children's engagement levels. This heightened engagement is correlated by improved comprehension and retention of concepts. In the specific milieu of selected nursery schools in Uyo metropolis, such applications could cater to diverse learning styles, thus facilitating a more inclusive learning environment.

Secondly, early exposure to multimedia applications fosters digital literacy from a tender age. This competency is dispensable in the contemporary digital era. Pupil's in selected nursery schools in Uyo metropolis who interact with these applications regularly can navigate through basic digital interfaces, which is a foundational skill for more complex digital interactions in future educational endeavors and beyond.

Thirdly, multimedia tools that incorporate storytelling, songs, and interactive games in multiple languages can significantly enhance language acquisition and vocabulary expansion among young learners. The auditory and visual stimuli provided by these applications reinforce language learning in a manner that is more engaging than the traditional rote learning process.

Finally, while multimedia applications offer numerous educational benefits, there is also a potential downside. Over exposure or inappropriate use can lead to distraction, and a reduction in traditional playtime activities that are crucial for physical and social development.

CONCLUSIONS

In concluding the research study on the impact of multimedia applications in early childhood education in selected nursery schools in Uyo metropolis, it is evident that the integration of digital technologies into nursery schools curriculum has significantly enriched the educational landscape. Multimedia applications have offered a dynamic interactive platform that not only captivates young minds, but also facilitates a diverse range of learning experiences that cater to the multifaceted needs of early learners.

Findings of the study have underscored the positive correlation between multimedia usage and Improvements in cognitive, linguistic, and social-emotional development among children in their formative years. Through interactive softwares, educational videos, and digital games, children are now exposed to a stimulating learning environment that encourages exploration, problem-solving. and collaborative learning. These experiences are crucial in laying the groundwork for critical thinking, language acquisition, and interpersonal skills, which are indispensable in the evolving digital age.

Furthermore, the pivotal role of educators in the effective deployment of multimedia resources cannot be overstated. The study highlights the necessity for teachers to possess robust digital literacy skills and to adopt innovative teaching methodologies that seamlessly integrate technology into the curriculum. This requires not only initial training but also continuous professional development to keep abreast of technological advancements and pedagogical strategies that maximize the potential of multimedia in education.

However, the journey in towards fully realizing the benefits of multimedia applications in early childhood education is also fraught with challenges. These include the need for significant investment in technological infrastructure, the imperative of balancing screen time to avoid potential negative impacts on young learners, and the requirements for a strategic approach to curtail selection, to ensure educational quality and relevance.

In light of these findings, it is recommended that stakeholders in the education sector -ranging from policymakers to educators, and parents - collaborate to foster an ecosystem that supports the judicious use of multimedia in early childhood education. This encompasses investing in digital infrastructure, prioritizing teacher training, establishing guidelines for appropriate screen time and
curating high-quality educational content. By addressing these key areas, the potential of

multimedia applications to transform early childhood education can be fully harnessed, thereby equipping young learners with the knowledge, skills, and dispositions necessary for success in the 21st century.

RECOMMENDATIONS

It is paramount that some selected nursery schools in Uyo metropolis have adopted a strategic approach to integrate multimedia applications. This involves selecting age-appropriate content that aligns with educational objectives and curricular goals, rather than using technology for its own sake.

Secondly, educators should be adequately trained in pedagogical strategies that leverage technology to enhance learning outcomes. This includes the ability to select, evaluate, and integrate digital resources effectively into their teaching practices.

Thirdly, parents should be informed and involved in the digital learning process. This includes understanding the content their children are interacting with and establishing healthy boundaries around screen time to mitigate potential negative impacts.

Fourthly, there should be a continuous assessment framework to evaluate the impact of multimedia applications on learning outcomes. This can inform interactive improvements in the selection and utilization of these tools, ensuring that they remain aligned with educational goals.

Finally, efforts should be made to ensure equitable access to multimedia learning tools. This includes addressing the digital divide that may exist within the selected nursery schools in Uyo metropolis through initiatives like providing resources to underprivileged schools or communities to ensure that all children have the opportunities to benefit from the digital learning tools.

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