ISSN No:-2456-2165

Emerging Technologies, Security Issues and Innovations in Early Childhood Education

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Abstract:- Early childhood educators today must keep up with the rapidly evolving technology, innovations, and security problems that face the educational system as they rise in number and sophistication. To provide an effective and engaging learning experience in early childhood educational programs, educators must be familiar with the various technologies that are emerging and their applications, as well as innovative and aware of the trending innovations in education. Educators must also be up to date on the threatening security issues that are emerging and possible solutions to avert them. The use of technology in early childhood classrooms has become unavoidable in today's world; the safety of children should be the primary concern of every educator, and educators are expected to be open to new advances in their professions. It is the goal of this article to give educators with the essential and considerable amount of information about developing technologies and security challenges, as well as some of the innovations in early childhood education, in order to enhance the early childhood educational program.

Keywords:- *Emerging Technologies, Security issues, Innovation, Early childhood education.*

I. INTRODUCTION

Early childhood practitioners are becoming more important and expected to have a comprehensive awareness of developing technology, security issues, and advancements in early childhood education. As a result, the purpose of this article is to inform and educate educators about evolving technical equipment, as well as to prepare them to adjust to changes that may occur at any time. It also aims to make early childhood educators aware of the security risks that exist in their environment. As technology and communication play an increasingly important role in human existence, they open up a plethora of possibilities in social, and implicitly in educational and organizational, life as a whole (Mioara, 2012). Education innovations are particularly significant in light of the fact that education is so critical in constructing a long-term sustainable future (Serdyukov, 2017).

Emerging technologies are tools, innovations, and advancements that are used in a variety of educational settings (including distance learning, face-to-face education, and hybrid education) to serve a variety of educational-related purposes. They include technologies such as virtual reality, augmented reality, and holograms (e.g., instructional, social and organization goals). It is critical to emphasize that although emerging technologies may be considered new technologies, this is not necessarily the case. [...] these are the technologies that will likely become socially significant during the next 10 to 15 years, and are classified as "emerging technologies" (Rotolo *et al.*, 2015).

Specifically, security may be described as the condition of not being threatened, especially in terms of one's bodily well-being as well as one's mental, psychological, and emotional wellbeing. It provides protection against a wide range of dangers. Security is the protection of a person from bad ideas that, by directly hitting on him or her, cause him or her to become detached from their own convictions, holy goals, and religious beliefs (Norbekov, 2020). Norbekov (2020) explains that the need to ensure information and psychological security, which is directly related to man and society, man and state, person and his inviolability, nation and national values, including customs, traditions, historical and cultural heritage, generational succession, the nation's future, and the spiritual influence on the values associated with it, stems from the presence of destructive ideas and aggressive ideologies. Norbekov (2020) explains that the presence of destructive ideas and aggressive ideologies has a negative impact.

Our definition of innovation is an "alternative method of working" that brings together academics, practitioners and members of the community in a short-cycle process of cooperation in order to deploy, test, and adapt novel solutions. When it comes down to it, the definition of innovation is twofold: (1) to introduce something new; and (2) to make changes in something that has already been established, notably via the introduction of new processes, ideas, or products.

As a result, this study seeks to investigate the many developing technologies, security challenges, and innovations in early childhood education programs in order to provide early childhood educationists with a competitive advantage in order to provide a higher-quality program.

II. EMERGING TECHNOLOGIES

In the context of early childhood education (ECE), emerging technologies, which include tools, concepts, innovations, and developments used in a variety of educational contexts to serve a variety of educational-related

ISSN No:-2456-2165

goals, cannot be overstated. How you designed the integration of technology in the curriculum has a lot to do with technology in ECE. Because the use of technology in early childhood schools has become unavoidable, early childhood educators must be well-versed in some of the new technologies that are developing internationally. If technology is not yet a "must have," it is still developing. Email, for example, was formerly considered an optional tool. In reality, when just a few individuals in an organization had regular access to it, it was restricted in its efficacy as a communication tool. For most employees in most organizations, it is now a must-have, must-use technology. In this respect, a technology might be regarded "emerging" in the education sector while being considered "standard" in the commercial or corporate realm (Miller, Green & Putland, 2005) as cited in (Halaweh, 2013). Even though technology is deemed established in one environment, it might still be considered emergent in another (Halaweh, 2013).

According to Tech & Learning (2018); Pearson Education (2017); Research New Zealand (2018) in (Emerging Technologies | Google for Education,2019)thatin the United States, 82% of teachers believe that utilizing technology better prepares students for future careers, whereas in Australia, 48% of teachers are interested in professional development using digital learning to engage students. Similarly, eight out of ten New Zealand teachers believe that digital technologies have a beneficial influence on student success. Emerging technologies, according to this viewpoint, are technologies whose development, practical applications, or both are yet largely unmet, such that they are figuratively emerging into prominence from a background of nonexistence or obscurity. These technologies are primarily new, but they also include older technologies with significant untapped potential. Emerging technologies are frequently portrayed as having the ability to alter the status quo.

Veletsianos (2010) in(Roy & Giraldo-garcía, 2015)defines emerging technologies defined as tools, concepts, innovations, and developments used in a variety of educational contexts to fulfill a variety of educational purposes. He expands on this definition by saying emerging technologies: may or may not be new technologies; can be described as evolving organisms in the process of "coming into being,"; go through hype cycles; Meet the "not yet" criteria of (a) not fully understood, and (b) not fully researched or researched in a mature way, and are potentially disruptive, but their potential is mostly unfulfilled.

Although some scholars have argued against using computer technology in educational settings for young children's learning (Cordes & Miller, 2000) as cited in(Leonard, 2016), the impacts of technology in educational settings on young children's development have been well studied and are overwhelmingly beneficial. When compared to children who do not utilize computers in their schooling, children who use computers exhibit larger gains in intelligence, structure knowledge, problem solving, and language skills (Clements&Sarama, 2003; Haugland, 1999; Swaminathan & Wright. 2003; Vernadakis, *et al.,* 2005 in Leonard, 2016). The problem in early childhood education then becomes figuring out new ways to better integrate technology into the curriculum in order to foster young children's active engagement and thinking (Couse&Chen, 2010 as cited in Leonard, 2016).

The argument has recently turned from whether or not technology should be used in early childhood settings to how it should be utilized and how it can impact children's learning and development (Ko & Chou, 2011; Parette*et al*, 2010, Rosen &Jaruszewicz, 2009) as cited in (Zomer & Kay, 2018). Today, educators and policymakers are grappling with how to best use technology into pedagogical practice and curriculum design in early childhood settings. Rosen & Jaruszewicz (2009) in Zomer& Kay (2018)the term "developmentally appropriate technology usage," or "DATU," was coined to describe the process of establishing a technological environment in early childhood settings. The global reliance on digital technology and platforms has recently increased as a result of the COVID-19 epidemic(Beaunoyer *et al.,* 2020). In terms of technology, the COVID-19 pandemic has prompted large, instantaneous, and unprecedented changes in people's use of digital technologies and media (Guitton, 2020).In terms of technology, the COVID-19 pandemic has prompted large, instantaneous, and unprecedented changes in people's use of digital technologies and media.

A. Some Emerging Technologies in Early childhood Education

Today's classroom is an interactive environment in which both the teacher and the students use technology. Because today's young children are always connected and tuned in, whether through text messaging, iPods, WhatsApp, Facebook, twitter, other social networking websites, or other means, teachers must find a method to engage them on a technological level. Technology in the classroom is helping to keep students engaged by incorporating some of the most cutting-edge developing technologies into the classroom. It can be a touchy subject when it comes to the usage of technology in early childhood education. While some may believe that young children do not require technology, it can actually benefit their learning and development. Plus, in today's high-tech world, knowing how to use technology is a crucial life skill. However, kids aren't the only ones that benefit from the usage of technology. It also gives early childhood instructors unrestricted access to newer, more innovative teaching approaches, allowing them to create an active learning environment for their pupils (Why Is Technology Important in Early Childhood Education?, n.d.).

These technologies according to (What Is Trending |Examples of Technology in Early Childhood Education|, n.d.) include the following.

- **Near-pod Virtual Reality (VR) and Augmented Reality (AR):** Virtual reality (VR) is an intriguing breakthrough in the IT sector that uses an immersive method to help bring concepts to life. Near-pod VR can be used by teachers to enrich classes in history, biology, and just about any other subject through a VR experience. Using innovations such as Google Glass, several schools have begun

ISSN No:-2456-2165

experimenting with augmented reality. Outside of textbooks, augmented reality can be utilized to explore the world.

- **Digital Textbooks:** As some institutions move away from pricey paper textbooks and toward digital formats, digital textbooks are becoming increasingly important. Some schools are going beyond simply converting their textbooks to a new format. California started replacing some high-school textbooks with "open-source" digital books in 2009.
- **3D Printing:** Incorporating 3D printers into an ECE classroom is possible. Mini-models can be created by combining 3D printing and CAD software. Teachers of science can make 3D replicas of topic matter for students to touch and explore. This improves the effectiveness and engagement of the teaching and learning process.
- **SMART Boards:** In ECE classes, SMART boards are becoming more frequent. Smart boards are presently in use in various Nigerian states, owing to the covid-19 pandemic, which has forced some states to adopt the technology, like Lagos and Ondo, to name a few. Teachers can utilize these computer-connected white boards with a projector and special pens to write and record the day's lesson. Teachers can use the whiteboard to explain a concept, then save the lesson for later viewing by the students.
- **Cloud Technology:** Cloud technology is enabling a new educational approach known as "flipped classrooms," in which students see a course before class and spend class time discussing, working in groups, and doing analytical work(Albini *et al.*, 2019). Digital textbooks, lesson plans, videos, and assignments can all be stored and shared on the cloud in ECE.
- **Projectors:** In the classroom, projectors are a simple way to introduce technology to students. The projector is connected to the teacher's laptop and projects the screen from the laptop onto the front of the room's white board. This allows kids to see a bigger version of what's on the laptop screen. In the classroom, a projector is an excellent tool for involving students in technology.
- **Talking books and Word banks:** Books that speak to you when speech and words are combined, the link between written and spoken content can be strengthened. Early literacy and language development can also be aided by word banks and grids.
- **Digital Cameras:** Photographing their creative play and exchanging ideas can be done using digital cameras. Early childhood teachers' technical proficiency is determined by their participation in professional development. They can choose from a variety of paths, including learning new technologies, integrating technology, and discovering new technologies.
- **Webcams:** Encourage children to keep track of how an activity is going as they go.
- **Art software:** You may demonstrate this for them by creating a repeat pattern and printing it out.
- **Programmable toys:** Bee bots, as well as others like Pixie, have a lot of value. Ask the kids to draw a path on the ground and program the toy to follow it.

III. SECURITY ISSUES

The safety and security of small children should take precedence. A safe and secure learning environment is widely considered as an adult obligation to provide a safe physical setting for children's learning. (Barr et al., 2009). Children have the right to be totally protected against the possibility of physical or emotional abuse as a result of inappropriate contact with a sponsor or any other person(The Convention on the Rights of the Child, n.d.). Schools should thus be a safe haven for children, but unfortunately, there are numerous security issues ranging from kidnappings, missing children, leaking sensitive data about children, mismanagement of children's information, open school environments, risk in the collection of children, unauthorized access to school premises, insufficient supervision, failure to conduct risk assessments, and children leaving the school premises without permission.

This, in turn, necessitates the necessity for early childhood educators to be security conscious and aware of current security concerns that may jeopardize the educational development of children and other staff in the school's area.

IV. TECHNOLOGIES TO KEEP SCHOOLS SAFE AND SECURED

Some of today's security challenges in schools can be addressed using technology. With all of the headlines about school shootings, it's becoming more vital than ever to use modern technology to make schools safer.(Lynch, 2017). Implementing good high-tech security systems can be costly and time-consuming, but there are four guidelines to help you decide what is best for your school: know your school's specific requirements, start small, and grow smartly. Do not try to put in place all of the technological security systems at the same time. Include children's relatives in the decision-making process to avoid causing a ruckus. Remember to recruit staff to supervise, operate, maintain, and improve the system. According to Lynch (2017) the following will be of help in keeping schools safe and secured for children to learn:

- **Visitor Management System**: Before entering the school, many schools ask visitors to sign in on a paper log and present evidence of identification. However, a new technology may be employed to protect pupils; the administration can deploy a technological visitor management system. Visitors' state or federal identification is scanned, and the system runs a check against a nationwide database of registered sex offenders.
- **Net Safe Kit**: Many schools fear they will never be able to completely safeguard their students' internet information. As a result, they're highlighting the need of teaching students how to be prepared and secure online. This Net Safe Kit aids schools in teaching youngsters about cyber safety and digital citizenship.
- **Entry Control Equipment:** Not only should visitors be required to check in with the office before entering the building, but many schools believe it is vital to have all exits closed at all times. Entry control systems, such as electromagnetic doors that can be remotely locked or

ISSN No:-2456-2165

unlocked, should be installed in schools. Visitors ring the doorbell, and the office employees may select whether or not to unlock the doors for them.

- **Metal Detectors/X-Ray Machines**: Metal detectors and x-ray devices, especially in inner-city schools where violence and drugs are rampant, are a must to keep access to the school environment safe. This will allow firearms, knives, and other weapons to be detected before they are taken inside the school.
- **Surveillance Cameras:**In the United States, security cameras and video surveillance systems are installed in over 90% of schools. Cameras should be installed in school corridors, big rooms, libraries, playgrounds, and even classrooms, with a focus on the front door. Some security systems have alert buttons that send police emergency communications. Bullying in schools might also benefit from the cameras.
- Panic Buttons: During the day, teachers and older students can carry tiny panic buttons on their belts or pockets, such as the Mobile Duress panic button. If there is a problem or a threat, the teacher or student can press the button, which sends an alarm to both the authorities and the school officials.
- Mass Messaging Software: When there is a threat, schools can use mass messaging software to broadcast alerts to parents and staff at the same time. Messages may be transmitted by email, audio, or text, and they can be sent to PCs as well as smart devices. A variety of safeguards can also be used to keep youngsters safe and secure.

Other security measures to consider when it comes to keeping children safe in schools include: conducting risk assessments and reviewing security procedures on a regular basis; fire smoke detectors are tested weekly, and fire apparatus and alarms are serviced on a weekly basis; all visitors must be escorted at all times, and fences must be built around the school grounds; keeping track of children's entries and exits, as well as inspecting them throughout transitions (for example, from outdoors to indoors); panic alarms are installed in the yard, as well as cyber security technologies; staff vetting (e.g., enhanced disclosure and barring service (DBS) checks, identification verification, at least two references, qualification check, occupational health check; and early childhood educators who have a high level of security awareness may be able to improve the safety and quality of education and care for the children in their care.

V. INNOVATIONS IN EARLY CHILDHOOD EDUCATION

Education, as a social institution fulfilling societal demands, is essential for a society's survival and growth. It must not only be comprehensive and long-term, but it must also adapt over time to meet the difficulties of a globalized world that is always changing and unpredictable. This evolution must be systemic, consistent, and scalable; as a result, early childhood educators, administrators, researchers, and policymakers are expected to innovate teaching and learning theory and practice, as well as all other aspects of this complex organization, to ensure that all children are adequately prepared for life and work. A systemic discussion of educational advances is presented here (Lakshmi *et al.*, 2020).

Creativity is the ability to come up with fresh ideas. Doing new things is what innovation is all about (Levitt, 2021). To innovate, we must think beyond what we are doing now and come up with a creative concept that will allow us to conduct our jobs in a different way. The goal of each invention is to develop something that is different from what we have been doing, whether in terms of quality, quantity, or both. The invention must be put to work in order to have a significant, transformational impact, which necessitates rapid dissemination and large-scale application. "...the effective introduction of a new product or approach" is how most people define innovation (Serdyukov, 2017). "Innovation appears to contain two subcomponents," in essence. The first is the concept or thing that is unique to a single person or group, and the second is the change that occurs as a result of the acceptance of the object or idea" (Evans as cited in Serdyukov, 2017).

An idea, its implementation, and the outcome that follows from the execution of the concept and generates a change are the three primary phases in the innovation process. In the field of education, innovation can take the form of a new pedagogic theory, methodological approach, teaching technique, instructional tool, learning process, or institutional structure that, when implemented, results in a significant change in teaching and learning, resulting in improved student learning (Serdyukov, 2017). As a result, educational innovations aim to increase learning productivity and efficiency while also improving learning quality. As a result, ECE advances should boost both learning productivity and efficiency.

Educational innovations come in a variety of shapes and sizes. "There are advances in the way education systems are structured and governed, demonstrated by charter schools or school accountability systems," according to the US Office of Education. Instructional strategies or delivery systems, such as the utilization of new technology in the classroom, have undergone changes. There are new approaches to teacher recruitment, preparation, and compensation. The list is endless" (US Department of Education, 2015).

Theory and practice, curriculum, teaching and learning, policy, technology, institutions and administration, institutional culture, and teacher education are all areas where innovation may help move the educational system forward. It may be used in any part of education that has the potential to improve learning and learning outcomes. Educational innovation, in the same manner, affects all stakeholders: students, parents, teachers, educational administrators, researchers, and policymakers, and necessitates their active participation and support.

VI. EFFECTS OF TECHNOLOGY INNOVATIONS IN EDUCATION

A tool is nothing more than a chance with a handle.When we look at modern advancements, we cannot help but notice that the vast majority of them are physical,

such as laptops, iPads, and smart phones, or technology-based learning systems and materials, such as learning management systems (LMS), educational software, and web-based resources (Serdyukov, 2017). In whatever field of human endeavor, technology has always been a driving force and an instrument of invention. It is only logical that we anticipate educational Technology (ET) applications-based advances to improve teaching and learning. Even while technology is a valuable asset, it is not the exclusive or primary source of today's inventions. As a result, relying only on technology is not advisable.

The history of technological advancements in ET is overflowing with promise. It's easy to forget about the days when tape recorders and video recorders were first brought into the classroom, much alone television, instructional films or lingua-phone courses, overhead projectors and multimedia. The pleasure and energy they brought to our lessons were contagious! New presentation formats were developed in order to support a wide range of different learning styles. The use of visuals helped to make the classroom more realistic and livelier. When it comes to accessing information and increasing talents, information and computer technology (ICT) has brought additional possibilities. We can communicate with everyone on the planet in real time, through visual means, and even on the go, owing to the amazing advancements in communication technology (iPhones, iPads, Skype, FaceTime). Online learning, mobile learning, social networking learning, massive open online courses (MOOCs), virtual reality, virtual and remote labs, 3D and 4D printing, and gamification are all popular subjects right now. Can we, on the other hand, claim that all of this is contributing to the development of better learning abilities? Are we making full use of the potential of information and communication technology to improve education and increase learning output? Since 2010, computers, tablets, interactive whiteboards, smart phones, and a plethora of software have become commonplace, according to Cuban, an ET researcher and writer who published in the journal Science. Computers have a monetary value in the billions of dollars. Has academic achievement, on the other hand, improved as a result? Has there been a shift in the way we teach and learn? Is it true that the use of electronic devices in classrooms has resulted in more job opportunities? School boards, lawmakers, and administrators are all interested in finding answers to these basic concerns about education. The answers to these questions were 'no,' 'no,' and 'probably not,' respectively (Cuban, 2015 as in Serdyukov, 2017).

In the event that an idea comes to life, it is ultimately worthless without execution (Csikszentmihalyi, 2013 in Serdyukov, 2017). Innovating does not consist in just talking the talk, but in really doing the work. A further point is that an invention can only make a meaningful effect if it is implemented on a large scale. It is not enough to just develop innovations; they must be disseminated and implemented across educational institutions, which is a more challenging undertaking. We need a large number of implementers, as well as favorable circumstances for the invention to spread and create a result, in order for it to have a significant impact. In their work, "Using Information Technology to Enhance Academic Production," Massy and Zemsky in Serdyukov (2017) argue that technology should be utilized to increase academic productivity. Consequently, ECE should function as both inventors and implementers of new developments.

VII. CONCLUSION

Today's classroom has evolved into an interactive environment in which both the instructor and the students are actively involved with technology. It is past time for early childhood educators to be up to date on the latest emerging technology and how they are being used. Additionally, the safety of children, teachers, and other school personnel should be of the highest priority; as a result, educators must learn to incorporate the most recent security measures into their practices in order to avoid some of the most recent security challenges that are threatening the beginning of the school year's programs. Innovation and its implementation are required to create a substantial change in the way early year's programs are performed and managed, and technology is identified as one of the most effective methods for accomplishing this goal, it is closely watched. Understanding these elements in depth may inevitably result in a superior early childhood education experience for children.

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