LEVERAGING SMART SCHOOL LIBRARIES TO ENHANCE EARLY CHILDHOOD EDUCATION: INNOVATION AND IMPACT

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Abstract
The paper focuses on Leveraging Smart School Libraries to Enhance Early Childhood Education. Children at their tender ages need library information resources for their educational development. Emerging intelligent technologies are innovations in technologies, software, or applications that enable librarians to adequately prepare and present information content in an enticing way to users or learners, resulting in effective information service delivery. It pictured a smart library as a smart center in the school library that makes learning and other educational activities interactive. Speed reading software, Plotagon, and mathematics problem-solving software amongst others were identified as emerging intelligent technologies that can be used for smart school libraries. The paper acknowledged personalized instructions, enhanced learning resources, access to information as some of the benefits of smart school libraries in early childhood education. Recommendations were made on how to facilitate the incorporation and use of emerging intelligent technologies in school libraries
Keywords: *Intelligent Technologies, Libraries, Smart School Libraries, Early childhood, Education*

Introduction

The advents of intelligent technologies have flooded every facet of human endeavor, establishments, and institutions. Today, the traditional styles of carrying out tasks are enhanced by digital systems. The integration of these technologies in library activities at the elementary level is paramount because it will bring about the attainment of library objectives and the successful teaching-learning process. The principal aim of intelligent technologies in the library is to bring about effectiveness and efficiency in information processing and dissemination. Studies carried out by Okon(2020) & Ujo(2021) utilized quantitative measures to evaluate student performance before and after the implementation of smart library features, showing significant improvement in grades and test scores. The school libraries are not left behind in the utilization of intelligent technologies, hence there is a need for school librarians to embrace and take advantage of the rich benefit provided by these technologies for proper information processing and dissemination. A school library according to Macmillan (2010) is that type of library established in nursery, primary and secondary schools respectively. The aim of this library is to provide access to information resources that meets the information needs of pupils at that level. As a result of the impact of technologies, a school library is presently referred to as multi-media centre, media resource centre, instructional resources centre etc. These technologies not only simplify the learning process, but also improve the quality of teaching content, interactions, and teaching methods.

According to Nahak & Padhi, (2019), a smart library is a library without a single physical lending item on the shelves, without books in print, a library without shelves, just large, ventilated servers, and whirring digital archives linked through digital networks with machines for copying and

distribution. In the same vein Orji & Anyira (2021) defined smart libraries as libraries where all documents are stored in digital format, processed in digital format, and accessed using an automated system. This library renders smart services using smart methods and smart resources to foster learning comprehension among users

In early childhood education, intelligent technologies are greatly needed as they are fundamental tools needed for effective teaching and learning of school pupils. According to Mishra & Joseph (2012), there is an increasing demand to integrate intelligent technologies in libraries as the output of these technologies is visible in the library. Nevertheless, school children show more interest in using school libraries with assorted technological tools. In the same vein Fokides (2018) opines that school pupils acquire information better when presented or disseminated with intelligent technologies than in conventional ways, as new intelligent technologies are very appealing. Research conducted by Ogunleye & Osanyin (2021) indicates that the integration of digital tools in early childhood education, enhanced by smart libraries, can promote early literacy skills and cognitive development. Interactive learning platforms, e-books, educational apps have been shown to support the development of foundational reading, writing, and numeracy skills, which are critical in the early years. The sole idea of this paper utilizes constructivism theory to examine how smart libraries integrate advanced technologies, interactive tools and digital resources to support active, hands-on, and collaborative learning experiences in early childhood education that are pivotal to the constructivist approach. This is crucial because according to Brandsford, Brown and cocking (2000), Constructivism suggests that because individuals are not blank slates new knowledge is constructed by building upon prior knowledge and experiences. The paper therefore focuses on Leveraging Smart School Libraries to Enhance Early Childhood Education.

Conceptual Clarifications

Early Childhood Education

According to National Association for the Education of Young Children, "Early Childhood Education" concerns the education of children from birth to age eight (8 years), and is considered to be the most vulnerable stage of a person's life. The National Policy of Education (NPE, 2004) outlined the following objectives as vital to childhood education:

I. Effect a smooth transition from the home to the school
II. Prepare the child for the primary level education
III. Provide adequate care and supervision for children while their parents are at work
IV. Imbibe in the child the spirit of inquiry and creativity through exploration of the nature, the environment, art, music and playing with toys etc.
V. Inculcate social, moral norms and values
VI. Build a sense of co-operation and team spirit
VII. Teach good habits especially good health habits
VIII. Teach the basics of numbers, letters, colors, shapes, forms etc. through play.

Intelligent Technologies

Intelligent technologies are high-tech innovations that facilitate the creation and communication of information content to users. They are innovations in technologies, software, or applications that enable librarians to prepare and present information content in an enticing way to users or learners thereby resulting in effective information delivery. Libraries can react to this emerging

technology by making the library's website easily accessible via web-enabled mobile devices (Horsfall et al., 2021).

School Library

A school library is a type of library that supports school programs as well as the teaching and learning process. School libraries serve students by providing materials to meet their various needs and encouraging reading and the use of libraries (Oyetola and Adio, 2020). The educational aims of school libraries according to idiegbeyan-Ose and Okoedion (2012) include:

1) To stimulate and enhance the reading habit;
2) To develop in children the ability to read for information
3) To help pupils to increase and improve their knowledge of reading, speaking, and writing;
4) To train children to care for books and make good and intelligent use of the library;
5) To enhance children's reading and communication skills;
6) To provide children with information, both current and retrospective, and
7) To provide recreation.

Smart School Library

Smart libraries are libraries where all documents are stored in digital format, processed in digital format, and accessed using an automated system. This library renders smart services using smart methods and smart resources to foster learning comprehension among users (Orji & Anyira, 2021). Interestingly, in the authors' framework, smart libraries are libraries that render informative and educational services that are collaborative and innovative for the enhancement of knowledge. Nahak & Padhi (2019) went further to define a smart library as a library without a single physical lending item on the shelves, without books in print, a library without shelves, just large, ventilated servers, and whirring digital archives linked through digital networks with machines for copying and distribution. Hence, *smart school libraries* are libraries that make learning and other educational activities interactive with the primary goal of facilitating learners' comprehension which promote the attainment of educational goals. It allows learners to flow with developmental trends in education as it uses advanced technological software and applications that make learning activities collaborative.

Constructivism Theory

Constructivism is a theory of learning and knowledge construction that suggests individuals actively construct their own understanding and knowledge of the world, based on their experiences and interactions with it (Brandsford et'al, 2000). It is particularly influential in education, cognitive psychology, and social theory. The theory emphasizes that knowledge is not passively received but is actively built by learners as they process and make sense of new information.

Key Concepts of Constructivism

1. **Active Learning**: Learners are seen as active participants in their learning process rather than passive recipients of information. They don't just absorb facts, but engage with the material, question it, and integrate it into their existing mental frameworks.
2. **Knowledge Construction**: According to constructivism, knowledge is not something that is given to learners, but something that is constructed by them. Learners build on their prior knowledge and experiences, making connections and reinterpreting information to make sense of new experiences.

3. **Social Interaction**: Learning is often viewed as a social process in constructivism. Interaction with others—whether peers, teachers, or more knowledgeable individuals—plays a critical role in the development of understanding. Vygotsky's Social Constructivism stresses the importance of social context and collaborative learning, emphasizing how cultural tools, language, and social interactions contribute to cognitive development.
4. **Contextual Learning**: Knowledge is best understood when it is tied to real-world experiences and contexts. Learning is not abstract but is situated in specific contexts that provide meaning and relevance to learners.
5. **Problem-Solving**: Constructivism often focuses on problem-solving and inquiry-based learning, where learners are given opportunities to explore questions and solve problems on their own or with guidance. This helps develop critical thinking and deeper understanding.
6. **Scaffolding**: Scaffolding is a concept introduced by Vygotsky, referring to the support provided by more knowledgeable others (teachers, peers, or even tools) that enables learners to perform tasks they cannot do independently. This support is gradually removed as learners gain competence.

Emerging Intelligent Technologies for Smart School Libraries

The different emerging intelligent technologies that can be used for smart school libraries as enumerated by Horsfall & Opurum (2023) include:

Speed Reading Software This software is designed to help school children develop or improve their reading culture. Reading is a strategic activity meant to improve the knowledge of learners not only in academic matters but in other areas of life. It helps children's minds develop faster as they learn to read. Reading breeds knowledge which in turn produces success. It allows learners to rub their minds with greater minds. Truly, reading culture is not without benefits, to the learners it brings about improved vocabulary, memory development, and creativity, and at the national level, it promotes educational growth and development of the country. The speed-reading software helps teach learners how to read faster and increases reading comprehension. According to Egbe (2020), most speed-reading software comes with a variety of exercises, tests, and eye-strengthening training designed to help reduce negative habits while working to improve learners' reading culture e.g. 7-speed reading, Readers Edge, Rocket Readers, Ace Reader as well and Speed Reader X are examples of speed-reading software.

Spelling Software: It helps school pupils learn how to spell words and improve their spelling skills. The spelling software uses spell checkers to simplify spelling issues and assist users in building adequate spelling skills by correcting misspelled words. Working with the spell check option is a good practice to ensure high-quality spelling skills among school children. Egbe (2020) avers that spelling software also exposes beginners/learners to word pronunciation and meaning. Examples of spelling software include School Zone Spelling, Spelling Blaster, and Spell Track.

Mathematics Problem Solving Software: This is informative and educational software that teaches and strengthens the problem-solving skills of young learners around mathematics. They are designed to enable young learners with math anxiety to learn mathematics with ease. This software with the guidance of the school librarians presents mathematical problems in comprehensible form using pictures and objects in the form of realia which also aid the subtraction, addition, multiplication, and division of numbers. This software includes Mathguru, Crocodile Mathematics, Maths Solver, and iMathematics. They help reduce the feeling of tension and

apprehension that interferes with performance ability in mathematics and increase the skill of manipulation of numbers among learners. They are user-friendly mathematical modeling software for learners (Crocodile Mathematics, 2022). Constructivism often focuses on problem-solving and inquiry-based learning, where learners are given opportunities to explore questions and solve problems on their own or with guidance. This helps school pupils develop critical thinking and deeper understanding.

The Collaborative Board: The collaborative board is one of the most stimulating intelligent developments that can be used by school librarians to display or disseminate information contents to a given group of users/learners in an interactive form. Omieibi-Davids (2014) submits that the collaborative board has unique features for library instructions that are astonishing. It allows the school librarian to create, organize, store, and manipulate information or lesson content, draw, color increase, and decrease the sizes of objects to make learning delightful. The collaborative board could be described as a large computer tablet that can be used in the smart library to interact with the learners. It helps enrich educational activities and increase collaboration between the teachers and the learners. With the collaborative board, the librarian can scroll through pages perform zoom functions, and rotate objects where necessary during information display or presentation. Constructivism also stresses the importance of social context and collaborative learning, emphasizing how cultural tools, language, and social interactions contribute to cognitive development.

The Plotagon Software: This is a three-dimensional information content maker that allows librarians to produce informative and educational content that is very useful to learners. Essential information contents can be presented to users in digital and smart form with the help of this tool. For instance, the history or culture of a certain group of people or tribe may be presented or displayed in the smart library with the help of a Plotagon. This clarifies complicated situations and occurrences, reducing the learners' stress throughout the learning process. Plotagon has pre-made templates that suit or describe a variety of information content (Plotagon, n.d). The librarian is only expected to act as a director and designer to set up scenes in line with his information content. The Plotagon is easy to use because of its simplicity.

Benefits of Smart School Libraries in Early Childhood Education

Enhance digital Literacy Skills: Programs in smart libraries focus on developing digital skills. Report from a study conducted by Ojo(2021) on integrating technology in school libraries to enhance Science, Technology, Engineering and mathematics learning reveals that many smart libraries focus on Science, Technology, Engineering and Mathematics (STEM) resources and activities programs that integrate technology and hands on learning have been linked to higher interest. In a related study conducted by Kaur & Ranjan (2021) indicates that students exposed to digital literacy training perform better academically and are more proficient in using technology for learning.

Encouraging Pupils Engagement: interactive tools and participatory learning experiences can make reading and research more engaging, encouraging school children to spend more time learning and exploring new topics. According to Tolorunleke and Aji etal'(2019), school pupils' certainly like it more and learn better if they are engaged in important and appealing activities. Many smart libraries offer collaborative tools that facilitate team work and projects, helping school pupils to work together more effectively and develop team work skills. Research conducted by Dike (2020) on enhancing collaborative learning through smart school libraries in Nigeria revealed that collaboration fosters critical thinking and problem solving skills among students.

Personalized learning: Through adaptive technologies and data analytics, smart school libraries can offer personalized reading recommendations and tailored educational content, helping school children progress in learning at their own pace. Lestage (2009) stressed that smart school libraries provide means of individualizing instruction. This he said is possible through programmed learning which enable the learner to learn at his pace and also to work on his own.

Access to Information: Studies have shown that smart libraries provide wider access to digital resources such as e-books, online databases, and educational software. This is particularly important in Nigeria, where access to physical books and educational materials can be limited, especially in rural or undeserved areas (Ogunlade, 2020). Smart school libraries provide access to information through which children gain and improve their reading skills. This libraries offer a potential solution by offering digital content that can support early childhood education. The earlier a child starts to access information, the more efficient and lifelong this access will be (Adalikwu, Aji & Milcah, 2018). Smart school libraries also provide access to current and relevant information through online resources, keeping pupils abreast with latest development in various disciplines. According to Akinwunmi (2020) smart libraries often incorporate digital resources, allowing students to access broader range of information. This accessibility support research and enhances learning outcome.

Enhanced Learning Resources: Another benefit of smart school libraries to early childhood education is the provision of access to a wide range of digital resources, including e-books, educational apps, and interactive multimedia, which can cater to various learning styles and needs.

Support for different learners needs: assistive technologies and resources in smart libraries can support diverse learning needs, including those pupils with disabilities, by providing alternative format and tools for learning. According to Bray, Brown & Green (2004) intelligent technologies offers an unravel opportunities in supporting the physical challenged children in our educational system to aid their learning.

Factors Militating Against the Use of Emerging Intelligent Technologies in School Libraries

Despite the enormous benefits of smart libraries in early childhood education, there are significant challenges in the adoption of smart libraries in Nigeria's early childhood education sector. Key challenges according to Ajayi (2020) include insufficient infrastructure (internet connectivity and electricity) and resistance to technological changes. Other factors militating against the use of emerging intelligent technologies in school libraries, include.

Absence of Technical Literacy skills: A good number of school librarians lack the technical know-how to excellently utilize these technological tools. Okwu and Opurum (2020) affirmed that most librarians lack the required technological skills needed for the effective utilization of emerging technologies in the 21st century. This poses a boundless threat to the integration and proper utilization of these technologies in school libraries.

Poor Attitude of Library Personnel: The library personnel are a vital instrument in the library. Hence, the success or failure of the library depends largely on the library personnel. The library as a service-oriented organisation cannot use these technologies if the attitude of librarians towards these technologies is negative. Today, technophobia has become the other of the day among librarians, they do not see the use of emerging intelligent technologies in the library as an option. This is an internal de-motivator that has hindered librarians from equipping themselves with technological knowledge to fascinate the use of these technological tools. They still prefer the manual way of rendering services which is time-consuming and could affect the time of

users/learners. The attitude and acceptance of the new technologies by librarians are worrisome (Idoniboye-Obu & Opurum, 2022).

4.3 **Inadequate Funding**: The cost of purchasing and installation of emerging technological tools in school libraries spells impossibilities to school proprietors and school managers because of inadequate funds. Funding is a key factor for the effective and smooth running of any organization, of which the school library is not an omission. Lack of adequate funds is a major problem confronting the use of emerging intelligent technologies in school libraries today. It is important to note that the quality of technological tools provided in school libraries is partly a function of the quantum of funds available. The fund is required for the acquisition and maintenance of technological infrastructures. School libraries are often starved of vital funds that should be used for the acquisition of these technological tools.

Power Outage: This has to do with erratic power supply, especially electric supply. Lack of suitable power supply is one of the problems facing the utilisation of emerging intelligent technologies in school libraries in Nigeria. Facilities installed in smart libraries require a power supply to function effectively. The absence or irregularities in the supply of power pose a great challenge to the use of these technologies.

Conclusion and Recommendations

Technological transformation has gradually infused every facet of society, including the school library system. The effectiveness and consequent realization of corporate goals are heavily reliant on emerging intelligent technologies. The growth of emerging intelligent technologies is transforming many aspects of the library including library design, information quality, and mode of service delivery. The presence of intelligent technologies in school libraries make the teaching and learning of school children effective, stimulate pupils' interest in learning, motivate the learners, facilitate retention and recall in learning and extend pupils learning experience. Their incorporation in libraries increases learners' interest and the quality of outcomes in the educational process. It introduces innovations, creativity, and flexibility into learning, providing both educators and learners with the problem-solving and survival abilities required in a digital society. Smart school libraries are still a possibility at the elementary school levels if these technologies are properly adopted.

The following recommendations were made to facilitate the incorporation and use of emerging intelligent technologies in school libraries:

1. The government, national and international communities should pave way for efficient funding for the procurement of digital facilities to schools in Nigeria. They should also fund smart school library programs sufficiently to allow for adequate professional and support staff.
2. Seminar and workshop on technological innovations should be organized for school librarians periodically to keep them abreast with current trends in librarianship as well as empowering them with the appropriate technological skills required for the correct use of emerging intelligent technology.
3. School librarians should regard emerging intelligent technologies as agents of library revolution since this will help them accept and employ such technologies.
4. The Universal Basic Education Board (UBEB) and the National Association of Proprietors of Private Schools (NAPPS) should embark on regular training and retraining of school librarians on how to use these technologies as this will improve learning activities; and

5. There should be an improvement in the supply of electricity in the country by the Government. Where this is not achievable, school management should provide an alternative means of power to avoid power interruption and its resultant consequences on the use of emerging intelligent technologies in school libraries e.g. the provision of solar panels and inverter as alternative source of power.

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