Research in Social Sciences and Technology

https://ressat.org

E-ISSN: 2468-6891

Volume: 9 Issue: 2 2024

pp. 302-317

Advancing Young Learners' Scientific Literacy Through School Media Resource Centres

Martin Chukwudi Ekeh[a]

a. Department of Childhood Education, Faculty of Education
University of Johannesburg, Johannesburg, South Africa
Email: mekeh@uj.ac.za

10.46303/ressat.2024.37

Article Info
Received: April 2, 2024
Accepted: June 13, 2024
Published: August 3, 2024

How to cite
Ekeh, M. C. (2024). Advancing young learners' scientific literacy through school media resource centres. *Research in Social Sciences and Technology*, *9*(2), 302-317.
https://doi.org/10.46303/ressat.2024.37

ABSTRACT
This qualitative study explores the state of school media resource centres (SMRCs) and their impact on fostering scientific literacy among early-grade learners in Staff Primary Schools. Perspectives of primary school librarians were gathered through photovoice methodology and semi-structured interviews from four selected schools within Owerri Education Zone 1, Nigeria. Thematic analysis was employed to scrutinise the data, ensuring credibility and trustworthiness through member checking and triangulation. Findings reveal a glaring absence of functional SMRCs despite the presence of school libraries, impeding effective teaching and learning processes. Librarians expressed the significance of SMRCs in advancing scientific literacy, yet perceived constraints hinder their efficacy. Challenges include inadequate funding, technological infrastructure, security concerns, and outdated resources. Recommendations highlight the necessity for prioritised financing, professional development opportunities, and collaboration with external stakeholders to enhance SMRCs. Moreover, addressing electricity-related challenges, updating library collections, strengthening security measures, involving parents, and implementing talent development programmes are crucial. In conclusion, the absence of functional SMRCs in staff primary schools significantly impedes the progress and holistic development of scientific literacy of early-grade learners. Addressing these deficiencies is imperative to foster scientific literacy and ensure quality education in the 21st century.

KEYWORDS
Scientific literacy; early-grade learning; effective teaching; primary school libraries; school media resource centres; 21st century learners.

INTRODUCTION

Scientific progress and technological innovation exert a continual transformative influence across global domains, notably enhancing daily life. In recent times, there has been a discernible trend towards exploring and integrating artificial intelligence (AI), which assumes pivotal roles in education, commerce, healthcare, and defence sectors. This burgeoning interest in AI is conspicuous within academic realms, evident through its central position in conferences, workshops, scholarly gatherings, inaugural lectures, and deliberative forums. While proponents of AI extol its remarkable utility in streamlining tasks and improving quality of life, a cohort of sceptics perceive it as a potential threat, capable of displacing jobs and fostering societal lethargy and redundancy. Nevertheless, the inexorable march of science and technology in the 21st century underscores their indispensability in societal advancement and the imperative to cultivate scientific literacy among early-grade learners to facilitate their seamless integration into contemporary societal frameworks.

Amidst the COVID-19 pandemic of 2020, the reluctance observed among individuals to embrace the COVID-19 vaccine underscored the propensity of scientific illiteracy to instigate misconceptions within the populace, even among those deemed highly literate. In the realm of cybersecurity, my mother, an unfortunate victim of cyber-scammers resulting in the stealing of her hard-earned assets via her mobile device, exemplifies how scientific illiteracy can leave individuals vulnerable to exploitation, particularly in comprehending the intricacies of communication technologies. The deficiency in basic scientific literacy among young learners poses a formidable challenge in understanding the foundational concepts and principles within the Science, Technology, Engineering, and Mathematics (STEM) disciplines, consequently manifesting subpar academic performance in scientific subjects. As an educational cornerstone, scientific literacy nurtures young learners' critical thinking faculties, equipping them with the ability to scrutinise, analyse, synthesise, and make informed decisions, thereby mitigating susceptibility to pseudoscientific notions and dispelling confusion. In the contemporary era characterised by pervasive technological integration, the purview of scientific literacy extends to encompass digital literacy and the cultivation of responsible digital citizenship (Gqoli, 2024; Orakova et al., 2024). Consequently, it becomes imperative to introduce young learners to scientific knowledge at an early stage through school media resource centres, pre-emptively shielding them from potential victimisation by online scams, dissemination of misinformation, or instances of cyberbullying stemming from scientific illiteracy.

School Media Resource Centres (SMRCs) constitute invaluable educational settings within school libraries, pivotal for cultivating fundamental scientific literacy among young learners. Historically, school library resources predominantly comprised conventional prescribed textbooks integral to the school curriculum. However, contemporary trends have witnessed a broadening of the scope of school library collections, encompassing an array of materials such as textbooks, narrative literature, comics, periodicals, and multimedia resources, including graphic CDs, VCDs, internet connectivity, projectors, transparencies, and computer

facilities, among others (Afolabi & Elaturoti, 2016; Fabunmi et al., 2013; Ramasamy, 2021). This paradigm shift has prompted a redefinition, culminating in the adoption of the term "School Media Resource Centre" (SMRC) to encapsulate the expanded functions and resources available (Afolabi & Elaturoti, 2016; Jaigbogu et al., 2012). Consequently, integrating multimedia resource strategies for fostering basic scientific literacy has emerged as a critical component in augmenting the educational experience. This metamorphosis holds profound implications for primary school libraries globally, as they assume a pivotal role in acquiring, organising, preserving, and disseminating information to library patrons, explicitly focusing on enriching science-based pedagogy (Fabunmi et al., 2013).

Numerous challenges confront early-grade learners, typically aged 5 to 11 years, in cultivating basic scientific literacy and competencies, particularly in rural settings where access to diverse multimedia resources facilitating scientific learning remains limited (Fabunmi et al., 2013). Despite the potential benefits of SMRCs for these learners, educators often impeded their educational experiences with SMRC utilisation. This issue stems from early-grade learners' distinctive educational needs and learning behaviours, necessitating educators to accommodate their instructional practices' developmental stage, subject matter, pedagogical methods, and logistical considerations (Metzler, 2017; Mitchell, 2014). Although SMRCs may be absent in many rural primary schools, anecdotal evidence suggests a comparable scarcity in government primary schools within urban areas, prompting the researcher's focus on Demonstration Primary schools (Staff Primary Schools) managed by tertiary institutions within the study locale.

According to Afolabi and Elaturoti (2016), SMRCs and their dedicated personnel play pivotal roles across various educational dimensions. They contribute significantly to instilling fundamental scientific skills and nurturing scientific literacy among learners, often through initiatives like science clubs and associations to foster effective utilisation of innovative educational resources within schools. Additionally, SMRCs enrich the school curriculum by providing scientific, educational materials that facilitate learners' exploration and development of their talents and capabilities. Furthermore, SMRCs serve as repositories of instructional resources for educators, promoting their professional growth and development (Becker et al., 2017; Ternenge & Agipu, 2019). However, Afolabi and Elaturoti (2016) did not discuss the evolving roles of SMRCs in the 21st century concerning the scientific literacy of early-grade learners.

The 21st century has witnessed remarkable advancements in information dissemination, ushering in more sustainable and globally interconnected modes of interaction. Modern technology has proven adept at managing complex and challenging situations, revolutionising various facets of contemporary society (Afolabi & Elaturoti, 2016; Kilinc et al., 2023). In alignment with these advancements, education across all levels is dedicated to imparting valuable knowledge to learners, particularly fostering scientific literacy. Learners in the 21st century are immersed in this era's transformative communication and pedagogical paradigms,

which have significantly influenced early-grade education (Fabunmi et al., 2013). This paradigm shift is discernible as educators increasingly depart from traditional chalk-and-talk teaching methods in favour of a learner-centred approach, aiming to cultivate students' critical thinking skills and scientific literacy (Jaigbogu et al., 2012).

Nevertheless, educators encounter challenges establishing scientific learner-centred classrooms, often due to limited access to resources for implementing innovative teaching methods (Afolabi & Elaturoti, 2016). In this context, a well-equipped SMRC assumes considerable significance in 21st-century and early-grade classrooms, serving as a vital repository of educational materials conducive to fostering scientific literacy and other essential skills among young learners (Fabunmi et al., 2013). The significance of SMRCs within the framework of school libraries is profound, as they not only provide conducive learning environments but also foster opportunities for learners to engage in interactive discourse and collaborative learning activities, which are essential for developing scientific literacy (Ternenge & Agipu, 2019). Additionally, SMRCs promote cooperative endeavours among learners, encouraging them to tackle complex educational assignments collaboratively and fostering a lifelong learning and inquiry culture, including in scientific fields (Ternenge & Agipu, 2019). This commanding role of the SMRCs, therefore, informs the researcher to consider research advancing young learners' scientific literacy through school media resource centres

LITERATURE REVIEW

The onset of the 21st century brought forth several characteristics that have notably impacted scientific literacy within early-grade education. This epoch is marked by the extensive incorporation of technology into diverse spheres of life, with education being no exception (Chu et al., 2017; Sang et al., 2018). Early-grade education now embraces technological tools such as computers, tablets, and interactive whiteboards to enhance learning experiences (Lee et al., 2020; Olubendi, 2019; Zomer & Kay, 2018). This integration facilitates the utilisation of multimedia presentations, interactive learning platforms, and access to a myriad of online resources. Within this technological milieu, early-grade learners must develop scientific literacy skills, encompassing proficiency in digital tools, navigating online platforms, critically evaluating information sources, and exhibiting responsible online conduct (Curran & Ribble, 2017). Consequently, scientific literacy is integrated into the early-grade curriculum to equip learners for the digital era, emphasising the significance of adequately equipped SMRCs.

In the current era of 21st century early-grade education, there is a concerted effort to cultivate lifelong learning experiences for young learners. Excluding science from young learners' educational experiences would be detrimental to humanity, making its inclusion inevitable (O'Dowd, 2020). Scientific literacy is essential and should be fostered through diverse methods, including multicultural literature, virtual exchange programmes, international collaborations, and SMRCs (O'Dowd, 2020). Recognising each learner's strengths, interests, and learning styles underscores the necessity of establishing a learning environment that values and

encourages engagement with science (Davidson & Major, 2014; O'Dowd, 2020). When the educational setting supports science-based instruction, learning experiences can complement technology's role in delivering scientific literacy and personalised learning tailored to individual needs (Ekeh & Venketsamy, 2021; Xie et al., 2019). Creating flexible learning environments designed explicitly for science-based learning is paramount for nurturing learners' scientific skills (Ekeh & Venketsamy, 2021; Xie et al., 2019).

Fafunwa (2018) elucidated that education encompasses multifaceted teaching, training, learning, and skill development processes to prepare individuals for effective social integration. Additionally, he avowed that education is a conduit for transmitting societal values and fostering desirable attitudes across generations (Fafunwa, 2018). Next, it represents the culmination of advancements in a child's development, encompassing abilities, attitudes, and enduring positive behaviours (Fafunwa, 2018). Providing a quality education that facilitates and seamlessly integrates science literacy into society is imperative to ensure the emergence of a well-functioning science and technology-driven society with a promising future for early-grade learners. Achieving this feat requires an enabling environment with adequate facilities to realise educational objectives (Ekeh & Venketsamy, 2021). In the context of this investigation, it is assumed that the SMRCs play a crucial role in establishing such a conducive environment.

The significance of the SMRC in assisting teachers in achieving their educational goals is underscored by Afolabi and Elaturoti (2016), who identified a significant correlation between SMRC utilisation and improved learning outcomes, particularly in the social sciences. Consequently, they advocated for government initiatives to establish sufficient SMRCs to enhance teaching and learning activities. Furthermore, they emphasised the pivotal role of SMRCs in positively influencing learners' academic performance and overall educational development. In a related study, Ilori et al. (2020) highlighted the potential of library services to enrich Nigeria's primary education system while pointing out substantial inadequacies in SMRCs within many pre-primary, primary, and post-primary schools. They advocated for effective collaboration between library management and school authorities to establish well-equipped SMRCs, as improving educational outcomes is closely intertwined with enhancing access to quality learning materials (Ilori et al., 2020).

The SMRCs, as a resource centre, facilitate learner engagement with technology and adaptable learning environments. Most media resource centres have technological amenities, including computers, internet connectivity, and various digital resources. These technological provisions allow learners access to online databases, electronic books, educational websites, and multimedia materials, augmenting learning opportunities and refining their technological competencies (Softlink Education, 2023; Ternenge & Agipu, 2019). Additionally, the media centre serves as a hub for collaborative initiatives, group projects, and independent study (Softlink Education, 2023; Ternenge & Agipu, 2019). It furnishes a conducive learning atmosphere where learners can collaborate on tasks, exchange viewpoints, and engage in

discourse (Softlink Education, 2023; Ternenge & Agipu, 2019). Concurrently, it provides a tranquil and conducive setting for solitary study and reflection.

The 2022 Softlink Education project surveyed school libraries' status in Australia and New Zealand to identify prevalent trends and challenges affecting these institutions. This research indicates that school libraries in Australia and New Zealand benefit from sufficient funding, appropriate staffing levels, and dedicated library spaces primarily reserved for library purposes, which minimises their use for other activities (Softlink Education, 2023). Similarly, significant strides have been made in the most disadvantaged public elementary schools in the United States of America (USA) concerning the provision of librarians, media specialists, and the availability of resources within their SMRCs (Tuck & Holmes 2016). According to the USA National Education Report, these schools have undergone modernisation initiatives, incorporating portable technologies that grant both staff and students access to a wide array of media resources, such as laptops, video recorders, and players, accessible both on campus and remotely (Tuck & Holmes, 2016). This modernisation effort also includes provisions for internet connectivity, access to online databases, and the automation of resource circulation processes, all while ensuring inclusivity for students with disabilities (Tuck & Holmes, 2016).

A school media resource centre, also known as a library media centre, is a cornerstone in shaping learners' educational journeys, particularly in fostering science literacy. Tuck and Holmes (2016) emphasise the pivotal role of the SMRCs as a gateway to accessing and retrieving information. It houses a wide array of resources, including science-based books, journals, magazines, newspapers, reference materials, and digital resources, empowering students to delve into various aspects of science (Tuck & Holmes, 2016). This hub of knowledge facilitates research, information gathering, and exploration of diverse scientific topics (Fabunmi et al., 2013). Furthermore, Benard and Dulle (2014) stress the importance of the SMRCs in promoting scientific literacy, which fosters students' reading proficiency and critical thinking. The centre's diverse science-related materials ignite a passion for the sciences and enhance students' cognitive abilities, creativity, and imagination (Benard & Dulle, 2014). In today's digital age, navigating and critically evaluating information is essential. The SMRCs assume a crucial role in imparting general literacy skills, including the ability to locate reliable science resources, assess information for accuracy and bias, and understand the ethical use of information. This emphasis on information literacy is vital for equipping learners with the necessary skills to thrive in an information-rich society (Ngussa, 2015).

Next, SMRCs serve a dual purpose of supporting the school curriculum and nurturing a passion for lifelong learning. Resources within the centre are carefully curated to align with the curriculum and enhance classroom instruction (Softlink Education, 2023; Tuck & Holmes, 2016). Learners can explore supplementary materials, textbooks, and reference books that complement their coursework, allowing for deeper engagement with science subjects (Softlink Education, 2023; Tuck & Holmes, 2016). Additionally, as Benard and Dulle (2014) suggested, the centre provides a platform for honing students' research skills through project-based learning.

Librarians and media specialists are crucial in guiding learners in navigating diverse resources, imparting information science literacy skills, and teaching them how to use them (Ngussa, 2015; Softlink Education, 2023). These skills are essential for academic success and preparing students for higher education and future careers.

In essence, by providing access to a wide range of resources and fostering a love for reading and learning, the SMRCs contribute to developing lifelong learners (Ngussa, 2015; Softlink Education, 2023). It instils the value of actively seeking knowledge, staying informed, and embracing a continuous learning mindset beyond their school years in students. Investing in science literacy through robust SMRCs is critical for nurturing scientifically literate citizens capable of navigating and contributing to an increasingly complex world. To this end, the researcher aims to explore the advancement of learners' science literacy through school media resource centres.

METHODOLOGY

The subsequent sections delineate the procedural intricacies of the investigation, encompassing the research objectives, methodology, study context, sampling techniques, and the methodologies employed for data acquisition and analysis, thereby furnishing a comprehensive elucidation of the research endeavour.

Research Objectives:

Aligned with the study's focus on the pivotal role of school media resource centres in fostering scientific literacy among early-grade learners in the 21st century, the researcher endeavoured to scrutinise the following objectives:

1. Ascertain the availability of school media resource centres to advance the scientific literacy of early-grade learners.
2. Investigate librarians' strategies in nurturing scientific literacy among early-grade learners.
3. Identify perceived constraints hindering school media resource centres from advancing the scientific literacy of early-grade learners.

Research Approach and Design:

The researcher adopted a qualitative research paradigm to structure the inquiry, recognising its capacity to facilitate an in-depth exploration of the perspectives espoused by research participants concerning the phenomenon under investigation (Creswell, 2014; Silverman, 2020). Consequently, the selected research design focused on conducting case studies within primary schools situated in tertiary institutions of higher learning in the research context (Creswell, 2014; Silverman, 2020). The choice of a case study design was deemed appropriate owing to the exemplary nature of these institutions, which serve as benchmarks for the institutions they support, thereby epitomising academic excellence and setting educational benchmarks for other public and private primary schools.

Research Site and Sampling Techniques:

The research was conducted within the primary school libraries of all tertiary institutions within Owerri Education Zone 1. Owerri, the capital city of Imo State, Nigeria, is renowned for its development, concentration of employment opportunities for civil servants, and the accessibility of resources conducive to enhancing the region's quality of life. Consequently, a significant influx of individuals relocating to the city to pursue an improved standard of living has ensued. However, this pursuit has implications for the quality of education provided in the area, thereby warranting the researchers' decision to conduct the study therein. Four primary school libraries and their respective librarians were selected for this research endeavour through purposive sampling, as these schools met the criteria of serving as staff or demonstration schools for tertiary institutions within Owerri Education Zone 1 (Creswell, 2014; Silverman, 2020).

Research Participants

The research participants for the study were four primary school librarians (two males and two females) within the four tertiary institutions used as case studies. However, one of the participants could not continue the research because the primary school library of her institution was destroyed by flooding, leaving the school with no library at the time of this study. This withdrawal then reduced the number of participants to three (3): two males and one female. Participants SSP1, SSP2 and SSP3 were aged 45, 64 and 52, respectively.

Data Collection Procedure:

The data collection strategy for this study involved employing semi-structured interviews and photovoice methodology (Goodell et al., 2016; Silverman, 2020; Tsang, 2020). Semi-structured interviews were crafted to elucidate primary school librarians' perspectives on the research objectives, while the photovoice methodology aimed to provide visual insights into the school media resource centres across various primary schools (Tsang, 2020). The data collection phase spanned two weeks and entailed visits to multiple schools to gather pertinent information, while the entirety of the research endeavour extended over three months. The interviews were recorded audibly to ensure accuracy and precision in data capture.

Data Analysis Approach:

For data analysis, the researcher employed thematic analysis to scrutinise the semi-structured interviews conducted with the participants. Initially, transcriptions of the recorded interviews were generated, facilitating familiarity with the collected data. Subsequently, the data were categorised into codes and thematic segments. Before the data analysis findings were presented, these recurring themes were organised and refined. Drawing from Tsang's (2020) delineation of strategies for analysing photovoice data, the researcher employed methods such as researcher interpretation, cross-comparison of photovoice content, and participants' responses to derive meaningful insights from the collected data.

Trustworthiness:

To ensure the authenticity of the data, the researcher implemented member checking, whereby transcribed data were provided to participants post-transcription for review and validation of

the accuracy of their responses (Goodell et al., 2016). Additionally, the data's trustworthiness, appropriateness, and credibility were reinforced through the triangulation of information from diverse sources, including collected data, participants' responses, photovoice material, and existing literature.

Ethical Considerations:

Ethical considerations in qualitative research include obtaining participants' informed consent, ensuring confidentiality, and upholding the study's integrity (Creswell, 2014; Goodell et al., 2016). In this study, researchers meticulously obtained written consent from participants and provided clear explanations of their rights, including the option to withdraw from the research without repercussion. Identities were anonymised using codes such as School A/ SSP1, School B/ SSP2, School C/ SSP3, and School D/ SSP4, denoting "Staff School Participants 1, 2, 3, and 4" to safeguard the privacy of staff schools and participants. Furthermore, the researcher obtained ethical clearance from the research ethics committee of the Faculty of Specialised Education at the Alvan Ikoku Federal University of Education to conduct the research.

DISCUSSION OF FINDINGS

The crux of any research lies in dissecting its data. Here, I delved deep, sifting through findings to unearth patterns and unveil their significance. I connected the dots to existing knowledge, offering fresh insights, enriching our understanding and fuelling academic discourse.

Figure 1.

Availability of school media resource centre in advancing scientific literacy

School A-SSP 1 School B- SSP 2 School C- SSP 3

The photovoice of the participant schools revealed the state of school media resource centres in advancing scientific literacy for early-grade learners. In the words of SSP 1, he noted, "*Although we have the school library, we don't have a media resource centre. Our library doesn't have accessories like audio-visuals, radios, tape recorders, VCDs*, *computers, internet, and electricity"*. SSP 1 further elucidated:

> *Having a media resource centre will help lessen our burdens, facilitate learning, and help learners understand faster because children learn more when they see visuals. It will help learners comprehend more quickly and make them visit the library more often.*

Similarly, SSP 3 acknowledged that,

> *media resource centres are indispensable in teaching and learning because they help concretise learning and bring it closer to the students. So, its role cannot be overemphasised, but we currently do not have a media resource centre in our school.*

However, SSP2 said, *"Everyone in school knows that the school media resource centre is a very important area for learning. We had it right in our school library, but it was vandalised*".On a sombre note, SSP 4 sadly informed us:

> *There used to be a library here, but it was destroyed by flood, which also drenched all of the paperwork in the headteacher's office, the library, the computer, and everything else. This was because our school was adjacent to Lake Nwaebere; however, we moved to a different building three years ago. After relocating us to our current permanent site, the University is yet to fund anything else. I have to wait for the University before considering a location to set aside as a school library now that I have taken office. Hence, we don't currently have a library.*

The collective responses gathered from participants underscore the consensus that aligns with the assertion made by Afolabi and Elaturoti (2016) regarding the significant enhancement of student engagement and comprehension through SMRC. Invariably, SMRC facilities are shown to bolster scientific literacy among young learners. These findings echo the conclusions drawn by Afolabi and Elaturoti (2016) on the pivotal role of SMRCs in fostering reading skills and habits crucial for scientific literacy, alongside facilitating holistic growth encompassing intellectual, emotional, and social dimensions.

Additional support for these conclusions is drawn from the work of Fabunmi et al. (2013), which underscores the challenges early-grade learners face in rural areas due to limited access to multimedia resources necessary for diverse teaching and learning approaches. Furthermore, Ternenge and Agipu (2019) highlight the vital role of conducive learning environments, such as SMRCs, in promoting interactive learning experiences essential for advancing scientific literacy among young learners.

In response to research objective one, it is evident that staff schools, renowned as exemplars in tertiary education, paradoxically lack functional SMRCs. This deficiency constitutes a significant obstacle to the practical advancement of scientific literacy among early-grade learners, significantly impeding their overall progress and development.

Understanding librarians' strategies for nurturing scientific literacy

Despite confirming the existence of non-operational school media resource centres in all selected schools for this investigation, the researcher explored the strategies librarians employed to foster scientific literacy among early-grade learners if equipped with functional SMRCs. In reply, SSP 1 of School A mentioned **storybooks** as a strategic tool, he stated:

> *I used storybooks as a strategic tool to promote reading and enhance literacy development. By distributing copies of these books to the children, they were able to acquire reading skills. Additionally, I introduced a borrowing and lending system, allowing students to take the books home and read at their leisure. Regrettably, I had to*

> *discontinue this practice because some students refused to return the borrowed books, resulting in inventory loss. Moreover, I implemented the assignment of tasks that could be found on Google, instructing students to access and read specific stories using their parents' smartphones. Upon completion, they would then come to the library and share their experiences.*

SSP 1 suggested that organising a talent hunt among learners would be another strategy he would implement if he were provided with a fully equipped SMRC. He recounted a previous experience: *"There was a time when I aimed to discover students' talents in our school. I encouraged them to showcase their talents, and some demonstrated exceptional drawing skills."* Additionally, SSP 1 emphasised the importance of engaging library users in an essay writing competition, with awards given to the top three performers, as a crucial strategy for nurturing scientific literacy through the school media resource centre.

According to SSP 2 in School B, she noted:

> *We conducted some research for our classes using **information technology tools** like computers and Wi-Fi in addition to books, textbooks, and storybooks. The most straightforward approach for us to include students in research was for them to ask their parents for permission to use their phones at home after we had given them tasks. They used their parents' phones to research and returned with the required results.*

Additionally, SSP 2 asserted that to support students' scientific literacy skills and media literacy when they had a functional SMRC, "*Well, because we want them to develop scientific literacy, we allow them to use the system by letting them into the inadequately resourced school media resource centre most of the time".* SSP 2 maintained,

> *We've done a great job encouraging the kids to enjoy and cherish reading. Because we started early to introduce novice reading in primary school, you'll notice that the kids carry their novels even during break time. We've given them three books apiece, and they're working hard to finish them and grab another one. Some of them have even asked for more.*

In the words of SSP 3, if allowed to own a school media resource centre, we would "*try **integrating culture into the songs** and into the topic that we're teaching and then begin to play the songs as we interpret them in whatever language, whether Igbo or English and then immediately they follow*". He mentioned "*We lend books to students and then ask them to summarise the story; that's one strategy that works*". SSP 3 further stated that "*We also give them passages to read, and they answer questions we construct to ensure we can detect whether they read the book, more so, we challenge them by giving them homework to do assignments".* For instance, SSP 3 indicated that he created a poem about traffic to remind learners of the necessary actions before crossing. Upon reaching the traffic, learners read and implement the guidelines outlined in the poem.

The participants' responses align with the concepts presented by Benard and Dulle (2014), who described SMRC as a platform fostering enhancing learners' research skills during

project implementation and promoting scientific literacy through reading. Participants suggested utilising storybooks, talent hunts, and information technology as effective strategies for nurturing scientific literacy among early-grade learners, echoing the ideas put forth by Tuck and Holmes (2016), who underscored the importance of SMRC in providing diverse information resources such as books, journals, magazines, newspapers, reference materials, and digital resources.

The findings from the participants also support the notion that learners can benefit from accessing online databases, e-books, educational websites, and multimedia materials to enrich their learning and enhance their scientific and technological skills, as proposed by Softlink Education (2023) and Ternenge and Agipu (2019). Moreover, participants agree with Softlink Education (2023) and Ternenge and Agipu (2019) that the media centre serves as a conducive space for collaboration, group projects, and individual study, fostering a positive learning environment where students can engage in discussions and exchange ideas to advance scientific literacy.

Overall, the results indicate that participants from staff schools comprehend strategies for nurturing scientific literacy despite being hindered by the non-operational status of the resource centres.

Constraints hindering the advancement of scientific literacy of early-grade learners

Participants shared their perspectives on the hurdles encountered by media resource centres in primary schools. In School A, SSP 1 expressed, "Digital and Scientific literacy isn't promoted due to resource limitations; we lack digital materials essential for the library's function." Highlighting funding constraints, SSP 1 emphasised the scarcity of storybooks and the urgent need for diverse reading materials, especially tailored for different age groups. Additionally, SSP 1 underscored the necessity for educational toys and interactive laptop devices to enrich learning.

Despite acknowledging parental contributions to the library budget, SSP 1 lamented a lack of involvement in budgetary decisions. Attempts at collaboration with the University Library yielded outdated resources (books), discouraging further engagement. Furthermore, SSP 1 cited restricted access to professional development opportunities, hindering skill enhancement in school library management. In School B, SSP 2 echoed challenges, including equipment breakdowns and thefts due to inadequate security measures. Financial limitations hindered participation in professional workshops aimed at updating media service practices.

Meanwhile, SSP 3 from School C highlighted the absence of a school librarian and dilapidated infrastructure. Theft incidents and outdated library resources compounded the challenges, reflecting a broader issue of insufficient funding affecting daily operations.

In summary, primary school staff libraries confront multifaceted challenges, ranging from financial constraints to inadequate professional development and security concerns. Consequently, the study proposes the following recommendations to address these issues.

Recommendations

The management of all staff primary schools should prioritise allocating sufficient funds to enhance and maintain school media resource centres (SMRCs) to promote scientific literacy effectively. This allocation should encompass acquiring updated scientific materials, including books, journals, and digital resources relevant to scientific education. Moreover, school management should facilitate professional development opportunities and training sessions tailored to school librarians and staff responsible for managing SMRCs. These sessions should focus on modern educational trends, particularly those related to fostering scientific inquiry and critical thinking skills.

Encouraging participation in scientific literacy-focused conferences, workshops, and seminars is vital for school librarians. These events provide platforms for sharing best practices in integrating science education into library services. Collaborating with external stakeholders, such as universities and local libraries, can yield additional scientific resources and funding opportunities for SMRC development.

School management must address electricity-related challenges to support digital scientific literacy by ensuring a reliable power supply for SMRCs. Exploring partnerships with technology companies and government initiatives can facilitate the provision of necessary technological infrastructure, such as computers and internet connectivity, to access scientific information online.

The management should prioritise updating and expanding scientific literature collections within SMRCs, including age-appropriate scientific storybooks and interactive learning materials. Establishing a systematic review process for library resources ensures they align with evolving scientific curricula and cater to diverse learner needs.

Enhanced security measures are essential to safeguard scientific resources and prevent theft or vandalism. Such measures should include installing security systems and collaborating with local authorities.

Involving parents in supporting SMRC development through contributions to library funds and promoting at-home scientific reading habits is crucial. Effective communication channels between school librarians and parents should be established to inform them about scientific literacy initiatives and available resources in SMRCs. Implementing talent development programmes within SMRCs can identify and nurture students' scientific interests and abilities.

Lastly, developing a routine maintenance plan for SMRC facilities ensures a conducive learning environment and prolongs the lifespan of scientific equipment. Regular maintenance checks should ensure all scientific resources remain in good working condition.

CONCLUSION

The analysis conducted through photovoice in the participant schools shed light on the state of school media resource centres catering to scientific literacy for early-grade learners. Despite the

presence of school libraries, the absence of dedicated media resource centres was evident, posing a missed opportunity to facilitate accelerated learning and comprehension among students. Participant feedback uniformly emphasised the pivotal role of a School Media Resource Centre (SMRC) in augmenting teaching and learning practices and, particularly, scientific literacy.

The study uncovered a disconcerting reality: despite their esteemed reputation as exemplary institutions in tertiary education, staff schools lack a fundamental element—a fully functional School Media Resource Centre (SMRC). This conspicuous gap undermines the educational environment and impedes the efficacy of learning processes for early-grade students. Consequently, this deficiency significantly stymies these learners' progress and holistic development.

Competing interests

This study has no vested interest from the public or non-profit organisation as it received no grant, funds or sponsorship.

REFERENCES

Afolabi, A. K., & Elaturoti, D. F. (2016). School library media resources availability as a predictor of secondary school students academic achievement in social studies in Ondo State, Nigeria. *Library Philosophy & Practice*.

Becker, S. A., Cummins, M., Davis, A., Freeman, A., Hall, C. G., & Ananthanarayanan, V. (2017). *NMC horizon report: 2017 higher education edition* (pp. 1-60). The New Media Consortium.

Benard, R., & Dulle, F. W. (2014). Assessment of access and use of school library information resources by secondary school students in Morogoro municipality, Tanzania. *Library philosophy and practice,* 0_1.

Chu, S. K. W., Reynolds, R. B., Tavares, N. J., Notari, M., & Lee, C. W. Y., & Lee, C. W. Y. (2017). Twenty-first-century skills and global education roadmaps. In *21st century skills development through inquiry-based learning: From theory to practice*, 17-32. https://doi.org/10.1007/978-981-10-2481-8_2

Creswell, J. W. (2014). Research design: qualitative, quantitative, and mixed methods approaches (4th ed. Ed). Thousand Oaks, California: SAGE Publications. https://doi.org/10.5539/elt.v12n5p40

Curran, M. B., & Ribble, M. (2017). P–20 model of digital citizenship. *New Directions for Student Leadership*, *2017*(153), 35-46. https://doi.org/10.1002/yd.20228

Davidson, N., & Major, C. H. (2014). Boundary crossings: Cooperative learning, collaborative learning, and problem-based learning. *Journal on excellence in college teaching*, *25*.

Ekeh, M. C., & Venketsamy, R. (2021). Ensuring child-friendly learning environments in Nigerian Early Childhood Centers. *The education systems of Africa*, 677-703.

Fabunmi, F. A., Richard, O. J., & Michael, O. (2013). Information and communication technology as a vehicle for improving the collection development of school library resources in Nigeria. *International Journal of Library and Information Science*, *5*(9), 267-271.

Fafunwa, A. B. (2018). *History of education in Nigeria*. Routledge. https://doi.org/1 0.4324 /9780429454905

Federal Government of Nigeria, (2004). *National policy on education*. NERDC Press Yaba Lagos

Gqoli, N. (2024). Digital Technologies for Mathematics Learning in Rural Higher Education: Students' Perspectives. *Research in Social Sciences and Technology, 9*(1), 265-278. https://doi.org/10.46303/ressat.2024.15

Goodell, L. S., Stage, V. C., & Cooke, N. K. (2016). Practical qualitative research strategies: Training interviewers and coders. *Journal of Nutrition Education and Behavior*, *48*(8), 578-585. https://doi.org/10.1016/j.jneb.2016.06.001

Ilori, M. E., Oluwafemi, V. S., & Odusina, E. S. (2020). School library services as a catalyst for the better basic education in Nigeria. *Indian Journal of Information Sources and Services*, *10*(1), 1-6. https://doi.org/10.51983/ijiss.2020.10.1.485

Jaigbogu, O. C., Osuchukwu, N. P., Obijiofor, A. V., & Ilorah, H. (2012). From school libraries to multimedia resource centres: The Anambra state experience. *Nigerian School Library Journal*, *11*, 1-11.

Kilinc, E., Tarman, B., & Yussupova, S. (2023). The Association Between College Students` Participation Behavior and Social Media Use*. Research in Social Sciences and Technology, 8*(2), 55-67. https://doi.org/10.46303/ressat.2023.11

Lee, S., Kuo, L., Xu, Z., & Hu, X. (2020). The effects of technology-integrated classroom instruction on K-12 English language learners' literacy development: a meta-analysis. *Computer Assisted Language Learning, 35,* 1106 - 1137. https://doi.org/10.1080/09588221.2020.1774612.

Metzler, M. (2017). *Instructional models in physical education*. Routledge. https://doi.org/10.4324/9781315213521

Mitchell, D. (2014). *What really works in special and inclusive education: Using evidence-based teaching strategies*. Routledge. https://doi.org/10.4324/9780429401923

Ng, B. (2018). The neuroscience of growth mindset and intrinsic motivation. *Brain sciences*, *8*(2), 20. https://doi.org/10.3390/brainsci8020020

Ngussa, B. M. (2015). Integration of media resources in Christian Religious Education: A case study of secondary schools in Chemundu zone, Kenya. *International Journal of Academic Research in Business and Social Sciences*, *5*(1), 197. https://doi.org/10.6007/ijarbss/v5-i1/1419

O'Dowd, R. (2020). A transnational model of virtual exchange for global citizenship education. *Language teaching*, *53*(4), 477-490. https://doi.org/10.1017/s0261444 819000077

Olubendi, D. (2019). *A Framework for evaluating the outcome of use of ict on early-grade literacy assessment; a case study of tusome literacy programme in Kenya* (Doctoral dissertation, University of Nairobi).

Orakova, A., Nametkulova, F., Issayeva, G., Mukhambetzhanova, S., Galimzhanova, M., & Rezuanova, G. (2024). The Relationships between Pedagogical and Technological Competence and Digital Literacy Level of Teachers. *Journal Of Curriculum Studies Research, 6*(1), 1-21. https://doi.org/10.46303/jcsr.2024.2

Ramasamy, K. (2021). *School libraries of 21st Century (A study of Kendriya Vidyalayas)*. Ashok Yakkaldevi.

Sang, G., Liang, J. C., Chai, C. S., Dong, Y., & Tsai, C. C. (2018). Teachers' actual and preferred perceptions of twenty-first century learning competencies: a Chinese perspective. *Asia Pacific Education Review*, *19*, 307-317. https://doi.org/10.1 007/s 12564-018-9522-0

Silverman, D. (Ed.). (2020). *Qualitative research*. Sage. https://doi.org/10.4135/9781526421036788354

Softlink Education (2023, March 6). 2022 School library survey report Australia and New Zealand. Softlink Education Blog. https://www.softlinkint.com/blog/2022-school-library-survey-report-australia-and-new-zealand/

Ternenge, T. S., & Agipu, O. L. (2019). Availability and utilisation of school library resources in selected secondary schools in Makurdi Metropolis. *Library Philosophy and Practice (e-journal)*, *2542*.

Tsang, K. K. (2020). Photovoice data analysis: Critical approach, phenomenological approach, and beyond. *Beijing International Review of Education*, *2*(1), 136-152. https://doi.org/10.1163/25902539-00201009

Tuck, K. D., & Holmes, D. R. (2016). Library/Media Centres in US Public Schools: Growth, staffing, and resources. Executive Summary. *National Education Association*.

Xie, H., Chu, H. C., Hwang, G. J., & Wang, C. C. (2019). Trends and development in technology-enhanced adaptive/personalised learning: A systematic review of journal publications from 2007 to 2017. *Computers & Education*, *140*, 103599. https://doi.org/10.1016/j.compedu.2019.103599

Zomer, N., & Kay, R. (2018). *Technology use in early childhood education*. Master's Dissertation, Ontario Tech University. https://doi.org/10.51357/jei.v1i1.45.