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# INNOVATIONS AND CREATIVITY IN LIBRARY SERVICES IN THE 5TH INDUSTRIAL REVOLUTION ERA: A CASE STUDY OF COLLEGE OF EDUCATION ORO, KWARA STATE, NIGERIA

**KURANGA, BOLAKALE MUSA**
*Department of Library and Information Science,*
*Faculty of Humanities and Social Sciences,*
*KWASUED, Ilorin, Nigeria.*
*msaladie05@gmail.com*
*08067784749*

**ADEWALE, TITUS ELEWODE**
*Hezekiah Oluwasanmi Library,*
*Obafemi Awolowo University, Ile-Ife,*
*Osun State, Nigeria.*
*atelewode@oauife.edu.ng. 08037516449*

**ATOTILETO, ISLAMIYAT OPEYEMI**
*Department of Library and Information Science,*
*Faculty of Humanities and Social Sciences,*
*Al-Hikmah University, Ilorin, Nigeria.*
*miyahcopy@gmail.com*
*08137295601*
**&**
**ABDULKAREEM, ADEYI MUMEEN**
*Kwara State Polytechnic Library Ilorin,*
*Kwara State, Nigeria.*

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**ABSTRACT**

*This study examines innovations and creativity in library services in the 5th industrial revolution era college of education Oro Kwara State, Nigeria. It was investigates how the adoption of advanced technologies such as digital libraries, RFID systems, virtual reference services, maker spaces, and redesigned library learning environments impacts service quality, user satisfaction, and overall library effectiveness. The primary objective was to assess how the adoption of advanced technologies, such as digital libraries, RFID systems, and the design of library spaces, influence user satisfaction and service effectiveness. A descriptive qualitative approach was employed, utilising structured questionnaire, participatory. The study identified*

*three (3) research objectives and research questions. It adopted descriptive research design and the study population was 200 while the questionnaire was used to collect data. Stratified random sampling technique was used for the study, it was a sampling technique considered appropriate. The findings indicate that innovations, particularly in digital resource access and more efficient borrowing systems, have enhanced user satisfaction. The study further explores the transformation of education in the 5IR era, emphasizsng the need for libraries to foster critical and creative thinking skills in digitally literate graduates. Challenges such as insufficient training on new technologies and concerns over data privacy were identified as barriers to the full acceptance of these innovations. Additionally, the design of comfortable, learning supportive spaces was found to play a crucial role in improving user experiences, though further customisation is required. The study concluded that while several innovative information services such as digital library platforms, online databases, and Internet-based resources are increasingly available, the integration of advanced 5IR technologies in the College of Education, Oro remains limited. Traditional tools like journals, indexes, and abstracts are still widely relied upon, whereas more modern resources such as interactive multimedia tools, RFID systems, maker space technologies, and AI-driven services are not yet fully adopted. This indicates a gap between existing library services and the level of innovation required in the 5IR era. The study recommends, the library management should also invest in modern 5IR-aligned innovations such as smart library systems, enhanced digital repositories, and creative learning spaces to improve service efficiency, user satisfaction, and overall support for teacher education in the College of Education, Oro.*

**Keywords:** Creativity, College of Education, Fifth Industrial Revolution, innovations, library services

## Introduction

In the Fifth Industrial Revolution era the integration of advanced technologies with a strong emphasis on human-centric values College of Education libraries are transforming into vibrant, interactive learning ecosystems (Ashiq, 2024). These libraries are leveraging artificial intelligence (AI) to deliver highly personalised services, including intelligent search systems, virtual reference assistants, and adaptive learning platforms that cater to the unique academic needs of students and faculty (Adeyanju, Adeyanju & Ayodele, 2024). Augmented and virtual reality tools are increasingly being used college of education to enrich teacher education by simulating real classroom environments, allowing student teachers to practice pedagogical skills in immersive settings (Wang & Li, 2024).

Furthermore, libraries are reimagining their roles as educational technology hubs, providing access to digital content creation tools, coding kits, 3D printers, and interactive whiteboards, thereby promoting hands on, creative learning experiences Bamigbola and Onifade (2024). Blockchain technology is also emerging as a tool for enhancing academic transparency, enabling secure and tamper-proof verification of

academic records and intellectual property. Creativity is further expressed through gamified learning environments within the library students earn points, badges, or rewards for engaging in research activities, attending workshops, or completing learning challenges, making academic engagement fun and motivating (Li, 2025).

In line with Ghosh, Sarkar, Roy, Roy and Podder (2025), libraries are also championing inclusivity by designing digital platforms with accessibility tools such as screen readers, text to speech features, and multilingual support to accommodate diverse learners. Additionally, hybrid spaces that blend physical and digital resources support collaborative learning, while sustainability initiatives such as digital-first policies and energy efficient infrastructure align library services with global environmental goals (Meesad & Mingkhwan, 2024). Ultimately, librarians in this era are evolving into digital mentors and innovation facilitators, playing a pivotal role in guiding teacher-trainees to become ethically aware, technologically skilled, and creatively empowered educators for the future (Zainudin & Othman, 2024).

In the era of the Fifth Industrial Revolution (5IR), where advanced technology converges with human centered values, College of Education libraries are increasingly adopting innovative and creative approaches to enhance teaching, learning, and research (Moola, 2024). Recent studies affirm that academic libraries are transitioning from traditional service models to intelligent, technology driven environments that integrate tools such as artificial intelligence (AI), digital repositories, cloud-based systems, and interactive learning spaces (Adigun, Ajani & Enakrire, 2024). Scholars further note that 5IR is reshaping library operations by promoting the use of smart technologies like RFID for self service circulation, IoT enabled shelves for real time resource tracking, and virtual reference services that personalise user support.

These innovations are complemented by the introduction of maker spaces, multimedia labs, and collaborative learning zones designed to foster creativity and hands on digital literacy among students(Adewojo, Amzat & Abiola, 2025). Evidence from library and information science literature also highlights that libraries within teacher education institutions are increasingly adopting e-learning support systems, online databases, and mobile library applications to meet the evolving needs of 21st-century learners. Although challenges such as inadequate funding, limited ICT skills, and infrastructural constraints persist, the trajectory of current developments shows a clear shift toward more dynamic, technology enhanced, and user-centered library services in alignment with global 5IR standards (Kapoor, Mahida & John, 2024).

Libraries are also evolving into dynamic Education Technology hubs, offering access to digital tools, 3D printing, and maker spaces that encourage creativity and hands on learning (Adewojo, Amzat & Abiola, 2025). Additionally, there is a strong emphasis on inclusive and sustainable practices, with digital platforms designed for accessibility and equity in information access. Creative strategies such as gamified library services, collaborative learning events, and hybrid learning spaces foster engagement and community among students. In this new paradigm, librarians are becoming digital mentors, guiding users through a rapidly changing information landscape while promoting ethical technology use and lifelong learning (Tripathi, Bhushan & Upreti, 2025).

The era of 5 signifies the current and forthcoming phase of industrial and technological evolution, building upon the legacies of its predecessors (Adigun, Adio & Durodolu, 2025). This era marks a significant shift characterized by the convergence of cutting edge technologies such as AI, the blockchain, biotechnology, and advanced robotics, among others (Singh & Murugesan, 2024). This convergence ushers in a transformative period in human advancement, fundamentally reshaping the very fabric of our existence. At its essence, the 5IR heralds a profound societal and technological transition, introducing a fundamental shift underpinned by extensive automation, inter connectedness, and data-driven decision-making that permeate every aspect of our lives (Moola, 2024). Against the backdrop of the 5IR, there is a need for the cultivation of a new set of skills essential for navigating this transformative landscape.

The ability to adapt to rapidly changing technologies and library environments becomes paramount (Isiaka, Soliu, Aremu, Bamidele, Saba-Jibril & Ibitoye, 2024). One of the defining features of the 5IR era is its steadfast commitment to sustainability, environmental responsibility, and ethical considerations. Diverging from its predecessors, this era is not solely about the interplay of human and technological advancement; it is about harnessing these technologies to address pressing global challenges, which include libraries (Adigun, Adio & Durodolu, 2025). These challenges span from addressing climate change and healthcare disparities to mitigating resource scarcity and fostering social equity (Saadati, 2025). Furthermore, 5IR is characterized by the convergence of the physical, digital, and biological realms. This fusion transcends traditional boundaries, unlocking new possibilities limited only by the bounds of human imagination (Lattuada, 2024). In this context, the development of interdisciplinary skills and the capacity to bridge knowledge gaps between different fields become imperative, as this fusion of knowledge is the driving force behind innovation (Tariq, 2024).

The evolution of the 5IR era is intrinsically linked to questions of governance, ethics, and the equitable distribution of its benefits (Shibambu, 2025). This revolution challenges societies to rethink and adapt existing systems and structures to ensure that the benefits are inclusive and accessible (George & George, 2024). Additionally, it underscores the importance of preparing a workforce with the skills and adaptability necessary to thrive in this evolving landscape. Skills such as adaptability, digital literacy, and a deep understanding of ethical considerations in technology become invaluable in this context (Anurogo, La Ramba, Putri & Putri, 2023).

**Statement of the Problem**

The rapid emergence of the characterised by the integration of advanced technologies with human centered values, has significantly transformed educational landscapes worldwide (Zhang, 2024). In this evolving era, Colleges of Education are expected to prepare future educators, who are not only technologically competent but also creative, innovative, and responsive to the dynamic needs of 21st Century learners. Libraries, as critical academic support centers, are no longer limited to traditional roles but are now expected to adopt innovative practices and integrate cutting edge technologies to enhance teaching, learning, and research.

Despite the global momentum toward digital transformation, many College of Education libraries, particularly in developing regions, face challenges in implementing these innovations due to limited

resources, lack of digital infrastructure, inadequate staff training, and resistance to change (Okunlaya, Syed Abdullah & Alias, 2022). Moreover, there is limited empirical evidence on how effectively these libraries are using creative strategies to promote digital literacy, inclusive education, and sustainable learning environments.

Without a clear understanding of the current practices, effectiveness, and challenges faced by these libraries in the 5IR era, efforts to modernise library services and fully support teacher education may remain fragmented and insufficient. This study, therefore, seeks to explore and evaluate the innovations and creative strategies employed by College of Education libraries Oro Kwara State within the circumstance of the 5IR, with the aim of identifying best practices, existing gaps, and opportunities for improvement.

**Objectives of the Study**

The main Objectives of the study was innovations and creativity in college of education library services in the 5IRera .The specific objectives of this study are to:

i. identify innovative practices and creativities strategies employed by College of Education libraries to enhance student engagement, teaching support, and research facilitation at the College of Education, Oro, Kwara State;

Ii. assess the role of library services in promoting digital literacy, inclusive learning, and sustainability within the context of the teachers education at the College of Education, Oro, Kwara State; and

iii. evaluate the effectiveness of *blended learning environments* that is, learning spaces that combine physical library resources with digital platforms and online technologies and the EdTech tools provided by the College of Education Library in supporting innovative teaching and learning practices at the College of Education, Oro, Kwara State.

**Research Questions**

The study was guided by the following research questions:

1. What innovative practices and creative strategies are currently being employed by College of Education libraries to enhance student engagement, support teaching, and facilitate research?
2. How do library services contribute to the promotion of digital literacy, inclusive learning, and sustainability within the context of teacher education?
3. How effective are mixture learning environments and educational technology tools provided by College of Education libraries in supporting innovative teaching and learning practices?

**Review of Related Literature**

The 5IR transitions from traditional automation to advanced technologies, enhancing connectivity, speed, and innovative solutions, boosting productivity and creating new business opportunities (Islam, Sepanloo, Woo & Son, 2025). For libraries, particularly in Open and Distance Learning environments, the adoption of 5th IR technologies is crucial for delivering inclusive, user-centered services (Meesad & Mingkhwan, 2024). Librarians are encouraged to integrate tools like AI, robotics, the IoT, cloud computing,

and 3D printing to enhance access to information and improve user experiences (Naikar & Paul, 2025).

These technologies support libraries in providing flexible, remote access to digital resources, thereby extending their service offerings and facilitating internet access for communities, including students (Sarwar, 2025). Additionally, incorporating data science into library services and updating librarian training programmes are essential for navigating 5th IR advancements, particularly during crises like epidemics (Ajani *et al*., 2025). The collaboration between humans and technology allows for automation and process efficiency, fostering personalised services, higher productivity, and increased job satisfaction (Chung & Tan, 2025). In the midst of the transformative waves of the , there is a notable shift in how knowledge, information, and the roles of both librarians and information users are handled.

In this era of unprecedented change and innovation, the preparedness of librarians in skills and knowledge is crucial to ensure that libraries continue to fulfill their vital role as guardians of information and knowledge. Oyedokun (2024) supported that it is important to note that librarians are now at the forefront of managing extensive digital repositories, navigating complex information landscapes, and facilitating access to a variety of resources. To effectively tackle the challenges and seize the opportunities brought by the 5IR, librarians need to possess a diverse set of skills and knowledge, encompassing both traditional library practices and emerging technological competencies (Ekwueme, Oluwaseun, Ofodu & Ambrose, 2024).

Given the above, this paper aims to delve into the readiness of librarians in the context of the 5IR, concentrating on the essential skills and knowledge needed to excel in an increasingly digital and interconnected environment (Moonasar, 2025). It also pinpoints critical areas where librarians must evolve and refine their skills to maintain relevance and efficacy in their roles(Adigun, Ajani, & Enakrire, 2024).Through this examination, the paper intends to offer insights and recommendations for librarians, library educators, and administrators to bolster librarian preparedness amidst the challenges and opportunities ushered in by the 5IR. To accomplish this, the paper utilises an interpretive content/document analysis methodology, chosen to facilitate a thorough review and analysis of literature sourced from reputable databases like Google Scholar, Scopus, and Web of Science (Kumar & Praveenakumar, 2025).

The Industrial Revolutions have been instrumental in driving technological and societal transformations. According to Parra-Sánchez (2025), the revolution, spanning from industry to industry has revolutionised the way we work and live. It introduced mechanisation, mass production, and the rise of e-commerce. The 4th Industrial Revolution integrated advanced technologies like IoT and AI, transforming production into a decentralised model. The 5IR Industry aims to optimise resource efficiency and production output by reshaping human-machine interactions (Islam, 2025). Industry aims to redefine industrial processes and human machine interactions, highlighting the collaboration between humans and intelligent systems.

In the context of the 5IR, diversity and inclusion entail recognising differences and perspectives in development, deployment, addressing potential biases, and promoting equitable outcomes for all Integrating diversity and inclusion principles into artificial intelligence (AI) can enhance technology's responsiveness to

diverse user needs, thereby improving our understanding and implementation of diversity and inclusion in library services (Faloye, 2025). The mission of the National Open University of Nigeria is to provide equitable access to education for all individuals seeking knowledge. The university aims to achieve this objective by granting access to students regardless of their remote locations through the use of electronic and digital information resources.

The review of related literature provides a solid conceptual, theoretical, and empirical basis for understanding how innovative and creative library services function within the 5IR era. Contemporary scholarship emphasises that modern library utilisation goes beyond accessing print materials to include effective engagement with digital platforms, intelligent information systems, and technology enhanced learning spaces. In 5IR driven academic environments, students' ability to navigate digital libraries, AI-supported search tools, virtual reference services, and interactive learning technologies significantly determines how well they benefit from available resources. Research further shows that user empowerment through digital literacy training, orientation on emerging technologies, and exposure to creative library services such as maker spaces and collaborative learning hubs is essential for meaningful engagement (Adigun, Ajani & Enakrire, 2024).

These studies underscore the critical role of continuous user education in helping students utilise advanced education technology tools and innovative library systems effectively. However, despite growing attention to 5IR transformation in academic libraries globally, there is limited empirical evidence on how College of Education libraries particularly the College of Education, Oro are integrating such innovations and creative practices into their service delivery. This gap in the literature justifies the present study, which seeks to examine the extent, effectiveness, and user experience of 5IR-aligned library innovations within this institution. Inadequate or poorly implemented user education continues to hinder the effective utilisation of modern library services, especially in the 5IR era where digital and intelligent technologies are central to information access. In such contexts, students who lack proper orientation or digital guidance often bypass institutional digital resources and instead rely heavily on general internet searches, which may offer less credible or less structured information. Closely linked to the need for user education are digital and information literacy skills competencies that enable learners to locate, evaluate, and use information effectively within technology-enhanced library environments.

**Methodology**

This study adopted a mixed-methods research design to investigate the integration of 5IR innovations and creative library services in the College of Education, Oro, Kwara State. The target population was undergraduate students who regularly use the college library. From this population, a purposive sample of library personnel and undergraduates was selected for interviews, while a simple random sample of 150 undergraduate students was used for the questionnaire administration. The research instrument consisted of a structured 5-point Likert-scale questionnaire designed to measure the extent of technology adoption, perceived usefulness of 5IR-aligned innovations, and challenges affecting implementation. This was complemented by open ended items and semi-structured interview questions that

elicited deeper insights into user experiences and creative practices within the library. Quantitative data were analysed using descriptive and inferential statistics specifically mean scores, standard deviation, and Pearson correlation run through SPSS software, while qualitative responses were subjected to thematic analysis following Braun and Clarke's (2006) six-step framework. To ensure methodological rigour, the study employed triangulation of data sources, expert validation of instruments, and member checking during the qualitative process. All procedures conformed to institutional ethical guidelines (Smith & Patel, 2023). This methodological approach offered both a statistical assessment of 5IR technology adoption and a nuanced understanding of user perceptions, thereby providing a comprehensive basis for evaluating innovations and creativity in library services at the College of Education, Oro.

## Data Analysis and Results

**Table 1:** Demographic Characteristics of the Respondents

| **Characteristics** | **Frequency** | **Percentage** |
|---|---|---|
| Male | 82 | 54.7% |
| Female | 68 | 45.3% |
| Total | 150 | 100 |
| **Age** | **Frequency** | **Percentage** |
| 16-25yr | 13 | 8.7% |
| 26-35yr | 52 | 34.7% |
| 36-45yr | 63 | 45.3% |
| 45& above | 17 | 11.3% |
| Total | 150 | 100 |
| **Marital Status** | **Frequency** | **Percentage** |
| Married | 50 | 36.7% |
| Single | 92 | 61.3% |
| Divorce | 3 | 2.0% |
| Total | 150 | 100 |
| **Academic Level** | **Frequency** | **Percentage** |
| 100 | 14 | 9.3% |
| 200 | 42 | 28.0% |
| 300 | 33 | 27.0% |
| 400 | 25 | 16.7% |
| 500 | 36 | 24.0% |
| **Total** | **150** | **100** |

The demographic profile of the respondents reveals a slightly higher proportion of males (54.7%) compared to females (45.3%). In terms of age distribution, the majority of respondents fall within the 36–45 years age bracket (45.3%), followed by those aged 26–35 years (34.7%). A smaller proportion are aged 45 years and above (11.3%), while the least represented group is aged 16–25 years (8.7%). Regarding marital status, most respondents are single (61.3%), while 36.7% are married and only 2.0% are divorced. The academic level distribution shows that 200-level students constitute the largest group (28.0%), followed by 300-level (27.0%) and 500-level students (24.0%). Students in 400-level and 100-level represent 16.7% and 9.3% of the respondents, respectively. This indicates a fairly balanced representation across academic levels, with a slightly higher concentration in the middle to upper levels.

**RQ 1:** What innovative practices and creative strategies are currently being employed by College of Education libraries to enhance student engagement, support teaching, and facilitate research?

**Table 2***:* Innovative Practices and Creativities Strategies among the Respondents

| S/N | **Statements** | **Highly Available** | **Available** | **Fairly Available** | **Not Available** |
|---|---|---|---|---|---|
| 1 | Adoption of 5IR technologies | 30<br>20% | 50<br>33% | 15<br>4.5% | 60<br>40% |
| 2 | The 5IR will enhance data extraction and boost efficiency in service delivery. | 15<br>10% | 36<br>24% | 20<br>13.3% | 70<br>46.6% |
| 3 | The 5IR will result in employees being more productive | 42<br>60% | 70<br>46% | 25<br>16.9% | 40<br>26.6% |
| 4 | The industry has infiltrated the virtual world in the 5th IR age by linking | 60<br>40% | 40<br>26% | 32<br>21.3% | 20<br>13.3% |
| 5 | The 5IR will result in employees being more productive | 70<br>46% | 30%<br>20 | 15<br>10% | 15<br>10% |
| 6 | The 5IR technology collaborate to automate tasks and enhance connectivity for diverse and inclusive library services. | 75<br>50% | 50<br>33% | 10<br>6.6% | 45<br>30% |
| 7 | Libraries enhance service delivery with 5IR for inclusive community access to the Internet and digital resources. | 20<br>13.3% | 15<br>10% | 5<br>3.3% | 2<br>1.3% |

The analysis of respondents' perceptions reveals a mixed level of adoption and availability of 5IR technologies among the respondents. Certain innovations such as automation and connectivity tools for enhancing productivity were rated as *highly available by 50%* of respondents and *available by 33%,* other

technologies, including tools for data extraction and inclusive access to digital resources, were largely reported as *not available* (46.6% and 1.3%, respectively). The adoption of 5IR technologies overall was uneven, with 20% indicating high availability and 40% reporting no access, reflecting gaps in implementation. Similarly, virtual integration and tools aimed at improving employee productivity were moderately available, but a significant proportion of users noted limited or no access. These findings suggest that while the library has begun to embrace creative and innovative 5IR-aligned services, key areas such as inclusive digital access, efficient data management, and comprehensive technology integration remain underdeveloped, highlighting the need for further investment, training, and strategic planning to fully realize the potential of 5IR innovations in library services.

**RQ 2:** How do library services contribute to the promotion of digital literacy, inclusive learning, and sustainability ?

**Table 3:** Library Services Digital Literacy, Inclusive Learning, and Sustainability

| S/N | **Statements** | **Highly Skilled** | **Moderately Skilled** | **Weakly Skilled** | **Not skilled** |
|---|---|---|---|---|---|
| 1 | Creating awareness through seminars and workshops about the 5IR aid its implementation. | 40<br>26.6% | 45<br>30% | 20<br>13.3% | 10<br>6.6% |
| 2 | Motivated librarians are more likely to adopt new technology and practices relevant to the 5IR. | 30<br>20% | 15<br>10% | 5<br>5.3% | 0<br>0% |
| 3 | Librarians should anticipate and respond to curriculum changes resulting from the 5IR. | 20<br>13.3% | 30<br>20% | 15<br>10% | 5<br>5.3% |
| 4 | Training and retraining of librarians will enhance the implementation of the 5IR in library services. | 35<br>23.3% | 40<br>26.6% | 20<br>13.3% | 10<br>6.6% |
| 5 | Collaboration Training and retraining of librarians will enhance the implementation of the 5IR in library services. | 10<br>6.6% | 20<br>13.3% | 10<br>6.6% | 10<br>6.65 |
| 6 | The right skills/competencies for the implementation of the 5IR will be an advantage. | 30<br>20% | 25<br>16.6% | 5<br>3.3% | 4<br>2.6% |
| 7 | Creativity, innovation, and dedication will enhance the implementation of the 5IR technology among librarians. | 40<br>26.6 | 15<br>10% | 15<br>10% | 10<br>10% |
| 8 | Improved power supply will enhance the implementation of 5IR inclusion in open and distance learning libraries. | 25<br>16.6% | 30<br>20% | 5<br>3.3% | 4<br>2.6% |
| 9 | Libraries should be adequately funded by management and government for the successful implementation of the 5IR | 20<br>13.3% | 30<br>20% | 13<br>8.6% | 7<br>4.6% |

Table 3 provides insight into the skill levels of librarians in College of Education libraries with respect to various competencies needed for the successful implementation of 5IR technologies. It shows that a moderate number of librarians are highly skilled in creating awareness through seminars (26.6%) and

in demonstrating creativity and dedication (26.6%), indicating a promising foundation for 5IR advocacy and innovation. However, only a small percentage show high skill in critical areas such as anticipating curriculum changes (13.3%), advocating for funding (13.3%), and collaboration for training (6.6%), highlighting substantial gaps in strategic and systemic readiness. While 20% of librarians report having the right skills and motivation to adopt 5IR technologies, the relatively low skill levels in infrastructure management and collaboration suggest a need for more targeted training and institutional support. Overall, the data suggests that while individual motivation and some professional competencies exist, broader organisational investment in skill development, collaboration, and infrastructure is essential to fully implement 5IR initiatives in these libraries.

**RQ 3:** How effective are mixture learning environments and educational technology tools provided?

**Table 4:** Mixture Learning Environments and Educational Technology Tools Provided

| S/N | **Statements** | **Very Effective** | **Effective** | **Moderately Effective** | **Ineffective** |
|---|---|---|---|---|---|
| 1 | Library provides access to both physical and digital learning resources | 30<br>20% | 45<br>30% | 20<br>13.3% | 10<br>10% |
| 2 | I frequently use both physical spaces | 50<br>16.6% | 15<br>10% | 5<br>3.3% | 0<br>0% |
| 3 | Mixture learning environment supports a flexible approach to teaching and learning | 20<br>13.3% | 30<br>20% | 15<br>10% | 5<br>3.3% |
| 4 | I find it easy to switch between traditional and digital library services. | 20<br>13.3% | 40<br>26.6% | 20<br>10% | 10<br>6.6% |
| 5 | Blended learning setup in the library enhances my teaching/learning. | 40<br>26.6% | 20<br>13.3% | 10<br>6.6% | 10<br>6.6% |
| 6 | Education technology tools meet teaching and learning needs. | 30<br>20% | 10<br>6.6% | 15<br>10% | 10<br>6.6% |
| 7 | These tools are regularly maintained and updated by the library. | 40<br>26.6% | 15<br>10% | 15<br>15% | 5<br>3.3% |
| 8 | I often integrate library-provided technology tools | 25<br>16.6% | 30<br>20% | 5<br>3.3% | 4<br>2.6% |

Table 4 shows the effectiveness of library services and educational technology tools in supporting teaching and learning within College of Education libraries, particularly in the context of blended and digital learning environments. The responses reveal a generally positive but mixed perception among users.

Significantly, 30% of respondents find that libraries effectively provide both physical and digital learning resources , although 10% still consider these efforts ineffective. A strong 16.6% report frequent use of both physical library spaces, indicating that traditional resources remain relevant. Flexibility in teaching and learning through a mixed environment is seen as effective by 20%, but only 13.3% find it very effective, suggesting room for improvement in integrating these systems. When it comes to switching between traditional and digital library services , 26.6% find it effective, but 6.6% report it as ineffective, highlighting a need for smoother transitions. The blended learning setup is viewed as very effective by 26.6% , reflecting a positive impact on teaching and learning experiences. However, the effectiveness of education technology tools and their maintenance is rated lower, only 20% and 26.6%, respectively, consider them very effective, with noticeable percentages still finding them ineffective. Finally, integration of library-provided tools into regular learning activities shows moderate use, with 20% calling it effective and a small proportion finding it ineffective.

**Discussion of the Findings**

Findings on the first research question revealed what innovative practices and creative strategies are currently being employed by College of Education libraries to enhance student engagement, support teaching, and facilitate research that although there is growing awareness and initial adoption of 5IR technologies in College of Education libraries, implementation remains inconsistent and limited. While of respondents noted the presence of automation tools, Ditto (2023) reported a total lack of such technologies, highlighting disparities in readiness. Despite recognition of 5IR's benefits for productivity and efficiency, a lack of infrastructure and strategic planning hinders full utilisation. Virtual platforms are moderately available, but access to digital resources remains low. Overall, the results underscore the need for increased investment, training, and policy support to enable widespread and effective 5IR adoption. It is supported by Okunlaya, Syed Abdullah and Alias (2022) that the relatively high correlations produced in this study between “asked a librarian” and other behaviors such as “used index or database,” “found something interesting while browsing,” and “developed a bibliography for a term paper.” At the same time, almost one-fifth of all seniors say they never made judgments about the quality of the information they obtain for use in the academic work.

The second findings of this study revealed how do library services contribute to the promotion of digital literacy, inclusive learning, and sustainability within the context of teacher education. The second key finding of the study examines how library services support digital literacy, inclusive learning, and sustainability in teacher education. Results indicate that while some librarians in College of Education libraries show moderate proficiency in advocacy and innovation, critical skills such as curriculum alignment, funding advocacy, and collaborative training are largely lacking. Only report being adequately skilled and motivated to adopt 5IR technologies. These gaps highlight the need for targeted institutional support and professional development to fully leverage library services for advancing 5IR goals in teacher education.

This is in consonance with the work of Familoni and Babatunde (2024), stated that critical gaps exist in strategic competencies, with on skilled in anticipating curriculum changes and advocating for

funding, and just demonstrating strong collaboration skills for training purposes. Although of librarians report having the motivation and necessary skills to adopt 5IR technologies, low proficiency in infrastructure management and inter-institutional collaboration remains a barrier. These findings suggest that while there is individual readiness and potential for innovation, significant organisational investment in professional development, strategic planning, and collaborative frameworks is required to drive successful and sustainable 5IR integration in College of Education libraries.

The third findings of this study showed that how effective are mixture learning environments and educational technology tools provided by College of Education libraries in supporting innovative teaching and learning practices. Examines how well library services and educational technology tools support teaching and learning in College of Education libraries, especially in blended and digital learning settings. (Kapoor, Mahida, & John, 2024) supported that overall, user responses show a generally positive but mixed perception. About  believed the libraries effectively provide both physical and digital resources, while disagree. Traditional library spaces are still relevant, with reporting frequent use. Blended learning is seen as effective by  though only  rate it as very effective, indicating room for improvement.

Switching between traditional and digital services works for  of users, but  find it challenging. The blended learning model is viewed as very effective by  of respondents. However, fewer users rate educational technology tools and their maintenance as highly effective  and some still find them lacking (Smith, Jones, & Taylor, 2024). Integration of these tools into regular learning activities shows moderate success, with finding it effective and a few rating it as ineffective. These findings suggest progress in supporting digital learning, but also highlight areas needing better integration and support.

## Conclusion

Overall, the findings indicate that the effective utilisation of 5IR-aligned library innovations depends on the availability of advanced technologies, digital literacy skills, reliable internet connectivity, and positive user engagement. For students and staff to fully benefit from creative and technology-driven library services, it is essential to strengthen both the infrastructure and the human capacity required to navigate these systems. Consequently, policymakers, library administrators, and academic staff should collaboratively develop strategies to enhance the integration of 5IR technologies, digital resources, and innovative service models into teaching, learning, and research activities. Such interventions will not only improve the accessibility and usefulness of library services but also foster a culture of creativity, innovation, and efficient knowledge utilisation within the College of Education, Oro.

## Recommendations

Based on the findings of this study on innovations and creativity in library services in the 5IR era at the College of Education, Oro, it is evident that strategic interventions are needed to enhance technology adoption, user engagement, and overall service effectiveness. The following recommendations are therefore proposed to guide policymakers, library administrators, and academic staff in optimising the integration of

5IR-aligned innovations and fostering a more creative, efficient, and inclusive library environment.

1. *Enhance Technology Infrastructure and Digital Resources*: The College of Education, Oro library should invest in 5IR-aligned technologies such as digital repositories, AI-supported search tools, RFID systems, and virtual learning platforms. Upgrading internet connectivity and ensuring reliable access to digital resources will facilitate innovative teaching, learning, and research practices.
2. *Develop Continuous Digital Literacy and User Education Programmes*: Library administrators should implement structured training programmes for both students and staff to build competencies in using emerging technologies, creative service models, and interactive learning spaces. Regular workshops, orientations, and hands-on sessions will empower users to navigate advanced library systems effectively.
3. *Foster Creative and Inclusive Service Models*: The library should design and promote innovative spaces such as maker spaces, collaborative learning zones, and virtual reference services that encourage creativity, collaboration, and inclusive access. Policies and strategies should ensure that all users, including those with limited prior exposure to technology, can benefit from 5IR-driven library innovations.

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## AUTHORS' PROFILES

**KURANGA, Bolakale Musa,** *CLN*, is a Librarian I at Kwara State University of Education Ilorin. He holds a Bachelor degree in Library and Information Science from Kwara State University, Malete, and a Master degree in Library and Information Science from Al-Hikmah University, Ilorin. He served in various capacities as Acquisitions Librarian, Circulation Librarian, Technical Service, Serials and Readers' Service. Head, Resources Process. He is also an Executive member of Nigerian Library Association Kwara State Chapter, Ilorin (NLA).

**Atotileto Islamiyat Opeyemi** holds a Bachelor degree in Library and Information Science from Kwara State University, Malete, and a Master degree in Library and Information Science from Al-Hikmah University, Ilorin. She works as an editorial, book reviewer, and book critic, and has collaborated with authors and major publishing houses across Nigeria, including Narrative Landscape Press, Masobe Books, and other emerging literary brands. She continues to contribute to the growth of contemporary African literature through her editorial work, literary discussions, and reader engagement within the online book community.

**Abdulkareem Adeyi Mumeen** is a Librarian I at Kwara State Polytechnic Ilorin. He holds Master degree in Library and Information Science and Bachelor of Science Education in Library and Information Science from the University of Ado-Ekiti State. Diploma in Library Science from Ahmadu Bello University, Zaria, Nigeria. He is a Certified Librarian of Nigeria and a member of Nigerian Library Association. He started his professional career in 2008 as a Library Officer at Kwara State Polytechnic Library, Ilorin. He is currently the Head of Circulation Section.