DIGITAL SUSTAINABILITY

TRANSFORMATIVE PATHWAYS FOR LIBRARIES

Edited by
S. Dhanavandan

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The Book

Digital Sustainability : Transformative Pathways for Libraries explores how libraries can use digital technologies to promote environmental sustainability, reduce their ecological footprint, and minimize resource consumption, focusing on energy-efficient practices, paperless operations, and eco-friendly initiatives. Through case studies, best practices, and practical insights, this book offers guidance on implementing sustainable practices in library settings. It explores how libraries can leverage digital resources, such as e-books, online databases, and virtual events, to reduce their environmental impact and support sustainability goals. Furthermore, the book explores the role of libraries as community leaders in promoting sustainability and environmental awareness. It discusses how libraries can engage patrons, stakeholders, and community partners in sustainability initiatives, fostering a culture of environmental responsibility and collective action. Overall, this book serves as a comprehensive resource for librarians, information professionals, and library stakeholders interested in integrating sustainability principles into their digital strategies and practices. It provides practical guidance, actionable insights, and inspiring examples to help libraries embark on a transformative journey towards digital sustainability and environmental stewardship.

The Editor

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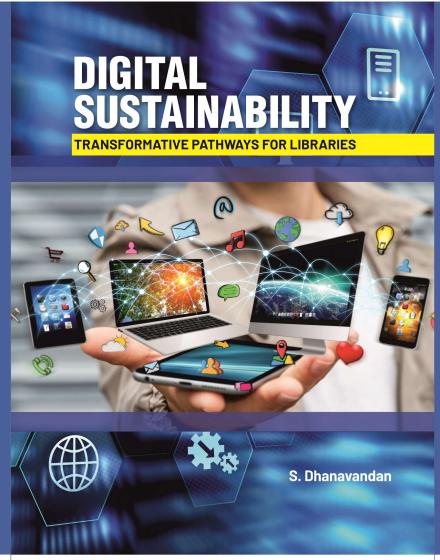
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Digital Literacy: Roots and Challenges for Prospective Teachers

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1. INTRODUCTION

Teacher education is a comprehensive set of programs and training designed to develop digital knowledge, skills, and attitudes for educating students. It covers subject experts, pedagogical techniques, classroom management, professional management, and digital literacy skills. Teachers play a crucial role in shaping students' intellectual, social, and emotional development, creating diverse learning needs, and adopting new technologies in the educational system. In the 21st century, teacher education faces new technological challenges, including online and digital learning methods, personalized learning, social-emotional learning, and blended learning. Prospective teachers must complete a teacher education program, which includes coursework in pedagogy, content knowledge, and classroom management. Digital literacy, coined by Paul Gilster, involves using information effectively and efficiently from various digital sources. It consists of technical, procedural, cognitive, and emotional social skills.

Table 1. Digital Competences 2.0 competence areas and competences

Competence areas		Competences	
1.	Information and data literacy	1.1	Browsing, searching and filtering data, information and digital content
		1.2	Evaluating data, information and digital content
		1.3	Managing data, information and digital content

2.	Communication and collaboration	2.1	Interacting through digital technologies
		2.2	Sharing through digital technologies
		2.3	Engaging in citizenship through digital technologies
		2.4	Collaborating through digital technologies
		2.5	Netiquette
		2.6	Managing digital identity
3.	Digital content creation	3.1	Developing digital content
		3.2	Integrating and re-elaborating digital content
		3.3	Copyright and licenses
		3.4	Programming
4.	Safety	4.1	Protecting devices
		4.2	Protecting personal data and privacy
		4.3	Protecting health and well-being
		4.4	Protecting the environment
5.	Problem solving	5.1	Solving technical problems
		5.2	Identifying needs and technological responses
		5.3	Creatively using digital technologies
		5.4	Identifying digital competence gaps

(**Source**: Nancy Law, David Woo, Jimmy de la Torre and Gary Wong (2018). *A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2.* Centre for Information Technology in Education (CITE), University of Hong Kong: UNESCO UIS-2018)

SCONUL (2006) developed the seven pillars model in digital literacy. The following seven aspects:

- Recognize information need
- Distinguish ways of addressing gap
- Construct strategies for locating
- Locate and access
- Compare and evaluate
- Organize, apply and communicate
- Synthesize and create

2. REVIEW OF LITERATURE

Ozcan, M. (2022) find the result of prospective teachers' digital literacy on mobile learning. The results say that moderate level cum positive and 35 percent of prospective teachers only using mobile based learning. The prospective teachers using the mobile learning significantly differ from gender, grade and department level variables.

Muhammad Mujtaba Asad, Jannat Gul, and Muhammad Aslam Lashari (2020) retrieve the result showing that prospective teachers are eager to accept the integration of Information and Communication Technology (ICT) in their teaching learning process

for the benefit of the user community in the 21st century education.

Iful Rahmawati Mega (2020) analyzed the study on student's perception on learning resources. The study found that the respondents are well competent on internet searching, hypertext navigation, content evaluation and knowledge assembly for good perception of digital literacy as learning sources.

3. DIGITAL LITERACY IN TEACHER EDUCATION

The NEP 2020 is a comprehensive policy framework that aims to revolutionize the Indian education system and prepare students to meet the challenges of the 21st century. The policy envisions transforming education through a learner-centric approach, promoting critical thinking, creativity, and problem-solving skills. NEP 2020 acknowledges the potential of technology in facilitating personalized and inclusive education and sets forth several digital education initiatives to achieve this vision.

4. DIGITAL LITERACY AND TEACHERS

In the present digital age, teachers need to keep up with technological advancements to teach their students effectively. Digital literacy is defined as the ability to use digital devices and technologies to find, evaluate, and communicate information effectively. Teachers who are digitally literate can create engaging and interactive lessons using digital tools, which can enhance students' learning experiences. Moreover, teachers can use digital platforms to communicate with parents, colleagues, and students. Digital literacy is not just about using technology but also about understanding how it works and its impact on society. Digital literacy can help teachers teach students how to use technology responsibly, how to stay safe online, and how to protect their privacy. This is particularly important in today's world, where cyberbullying, online harassment, and identity theft are prevalent.

5. BENEFITS OF DIGITAL LITERACY FOR TEACHERS

1. Improves teaching efficiency : Digitally literate teachers can save time by using online resources, creating digital lesson plans, and grading papers electronically. Independent from external factors such as weather conditions, traffic conditions, social activities, or events.

2. Enhances student engagement : Digital tools and applications can make learning more interactive and engaging for students, which can increase their motivation to learn.

3. Provides opportunities for professional development : Digital platforms can provide access to a wealth of information and resources for teachers to learn and grow in their profession and also open doors to earn more passive income to increase their financial status.

6. DIGITAL LITERACY INITIATIVES FOR TEACHERS IN INDIA

Our country has been actively working on digital literacy initiatives for teachers to

enhance their skills and adapt to the changing educational landscape. Some initiatives and programmes were launched by the Digital India Initiatives of the Government of India, which aim to transform the country into a digitally empowered society. It includes various programmes and schemes focusing on digital literacy, and teachers are often included in these efforts.

National Mission on Education Using ICT : The National Mission on Education Using Information and Communication Technology (NMEICT) has been envisaged as a centrally sponsored scheme to leverage the potential of ICT in the teaching and learning process for the benefit of all the learners in higher education institutions at any time and in any mode. It is a landmark initiative of the Ministry of Human Resource Development to address all the education and learning-related needs of students, teachers, and lifelong learners.

The National Digital Literacy Mission (NDLM) : The NDLM, now known as PMGDISHA (Pradhan Mantri Gramin Digital Saksharta Abhiyan), is a government initiative that aims to make rural households digitally literate. Teachers in rural areas may benefit from this programme.

National Council of Educational Research and Training (NCERT) : NCERT is involved in the development of educational policies and programmes in India. They may have specific initiatives or guidelines for teachers to use to enhance their digital literacy skills.

Teacher Training Programmes : Various organisations, both governmental and non-governmental, conduct teacher training programmes that include modules on digital literacy. These programmes are designed to equip teachers with the skills needed to integrate technology into their teaching methods.

Microsoft Education Initiatives : Microsoft has been actively involved in promoting digital literacy in education. They often collaborate with educational institutions and provide resources for teacher training in digital skills.

DIKSHA : Digital Infrastructure for Knowledge Sharing (DIKSHA) is an initiative of the National Council of Educational Research and Training (Ministry of Education, Govt. of India).

MOOCs on SWAYAM : The National Council of Educational Research and Training (NCERT) has been designated as the national coordinator (NC) for the development and dissemination of massive open online courses (MOOCs) for school education, specifically catering to Classes IX to XII. These courses will be accessible through the "SWAYAM" (Study Webs of Active Learning for Young Aspiring Minds) portal and mobile app. SWAYAM is dedicated to bridging the digital divide and extending educational opportunities to students.

NCF Tech Platform : As per the National Education Policy, 2020, the following four NCFs will be developed: The National Curriculum Framework for Early Childhood Care

and Education (NCFECCE) National Curriculum Framework for School Education (NCFSE) The National Curriculum Framework for Teacher Education (NCFTE) and the National Curriculum Framework for Adult Education (NCFAE) In this regard, the Ministry of Education (MoE) and NCERT have jointly developed a comprehensive strategy.

Accessibility in School Curriculum : Efforts towards equitable education and inclusive education aim to address educational needs that arise as a result of belonging to SEDGs as well as those that arise despite having no association with SEDGs. Addressing special educational needs demands the availability of resources in multiple modes and flexibility in content delivery for personalised adaptive learning. Mentioned below are the major initiatives taken by NCERT to make education accessible to all.

7. DIGITAL LITERACY IN LIBRARY NETWORKS

Networking of libraries for connection between one library and another library for sharing their resources, avoiding duplication of resources among the member libraries, and providing full-text electronic resources to member libraries.

8. DEVELOPING LIBRARY NETWORK (DELNET)

It is a major resource sharing network in India, started in 1992, with more than 8100 member libraries in around 33 states of India and some other countries. The prime motto of DELNET is "Networking Libraries, Sharing, and Spreading Knowledge." DELNET provides inter-library loans that include printed and online resources and a shared centralised online union catalogue among member libraries for the benefit of faculty, researchers, scholars, and students. DELNET provides valuable resources and services to produce future teachers with good learning capacity and knowledge of digital networks. DELNET also conducts training for budding users to develop effective information search strategies, evaluate sources critically, and avoid plagiarism. DELNET organises seminars and conferences on integrating technology into teaching and learning. There are some challenges to using the DELNET services among prospective teachers, including the digital divide, a lack of technical knowledge, and integration challenges. Despite these challenges, DELNET's commitment to promoting digital literacy among prospective teachers presents a valuable opportunity to prepare future educators for the demands of the digital age. By addressing the challenges and leveraging the available resources, educators can harness the power of technology to create engaging and effective learning experiences for their students.

9. DIGITAL LITERACY IN INFORMATION LIBRARY NETWORK (INFLIBENT) SERVICES

Information Library Network (INFLIBNET) was developed under the interuniversity centre of the University Grants Commission (UGC) for various services, including e-consortiums, open access initiatives, projects, and services, and library

automation. The e-consortium provides e-shodhsindhu, Shodh Shuddi, N-List, Infistats, and INFED, namely e-content, study materials for postgraduate studies, plagiarism detection tools, electronic resources, and databases. INFLIBNET (Information and Library Network) plays a crucial role in equipping libraries across India with cutting-edge digital resources and services. For prospective teachers, effectively utilising these resources can significantly enhance their digital literacy skills, preparing them for the demands of modern education.

10. E-PG PATHSHALA

The ePathshala, a joint initiative of the Ministry of Human Resource Development (MHRD), the Government of India, and the National Council of Educational Research and Training (NCERT), was developed in November 2015 to showcase and disseminate all educational e-resources, including textbooks, audio, video, periodicals, and a variety of other print and non-print materials. The digital India campaign has promoted extensive use of ICTs in the teaching and learning process. This platform provides access to high-quality e-learning resources for postgraduate studies in various disciplines, including education. Prospective teachers can utilise these resources to supplement their classroom learning, gain a deeper understanding of key concepts, and prepare for competitive exams.

11. E-VIDYA-MITRA (INTEGRATED E-CONTENT PORTAL)

Vidya-Mitra is an online learning portal for e-content projects under the NME-ICT initiative PMe-VIDYA. It unifies digital, online, and on-air education efforts, benefiting nearly 25 crore school-going children. The portal offers multiplatform educational resources, features like faceted search, usage statistics, project-wise access, and My-Space, making it useful for prospective teachers and skill development. The portal provides the facility to search and browse all hosted content, wherein a learner can easily access the desired material. It also offers multifarious educational resources in multi-platform mode, viz., digital/online, TV, radio, community radio, and podcasts, through a single interface. Moreover, features like faceted search, usage statistics, project-wise access, and My-Space are incorporated into this portal. It is one of the useful sources for prospective teachers and developing skills for using the portal.

INFLIBNET offers a range of literacy skills for prospective teachers, including the INFLIBNET Journal Finder, which helps locate relevant scholarly journals, developing critical information-searching skills, and enhancing technological proficiency through online platforms like Shodhganga and e-PG Pathshala. It also fosters communication literacy through online discussions and forums, and teaches critical thinking through evaluating research findings. INFLIBNET resources expose teachers to diverse perspectives, fostering knowledge sharing and peer learning. It also equips them for technology-integrated classrooms. The convergence of education and technology has made digital literacy a crucial skill for teachers in the 21st century. Library networks are

essential resources for honed digital skills and preparing for technology-integrated classrooms.

12. NATIONAL DIGITAL LIBRARY OF INDIA (NDLI)

The National Digital Library of India (NDLI) is the digital library portal under the Government of India project, supported and developed by the Indian Institute of Technology, Kharagpur, and It covers 9.8 crore of contents, and out of them, open access content is around 8 crore+, NDLI licenced content is around 6.5 crore+, and partner sources are 600 crore+. It is a major repository in India and provides vital resources in the academic field and research. It is built to provide support for all academic levels, including researchers and lifelong learners, all disciplines, all popular forms of access devices, and differently-abled learners. It is designed to enable people to learn and prepare from best practices from all over the world and to facilitate researchers' inter-linked exploration from multiple sources.

13. NDLI'S POTENTIAL FOR DIGITAL LITERACY

NDLI boasts a massive collection of educational materials in various formats, like ebooks, video lectures, tutorials, and research papers. This diversity can cater to varied learning styles and needs, which is crucial for fostering digital literacy skills. NDLI's free and open-access nature removes financial and geographical barriers, making it a valuable tool for educators across India. NDLI provides opportunities for hands-on learning with digital tools like search engines, citation managers, and online collaboration platforms. Resources on NDLI can be aligned with teacher education curricula, allowing prospective teachers to acquire digital skills relevant to their future classrooms. Studies on the specific impact of NDLI on digital literacy skills among prospective teachers are needed. Research on effective strategies for integrating NDLI into teacher education programmes would be valuable. Investigating challenges faced by prospective teachers in accessing and utilising NDLI resources can inform improvement efforts. Overall, NDLI presents a promising avenue for enhancing digital literacy among prospective teachers. By addressing existing challenges and conducting further research, we can optimise the utilisation of this valuable resource and prepare future educators for the digital age.

14. DIGITAL LITERACY ON GOOGLE PLATFORMS

The topic of digital literacy on Google platforms among prospective teachers is timely and crucial, intersecting with educational needs, technological advancements, and evolving societal changes. Google platforms provided a number of applications to prospective teachers for their preparation of lectures for the classroom and writing teaching methods, namely Google Meet, Google Drive, Google Classroom, Google Chat, Google Slides, Google Sites, Google Sheets, Google Docs, and Google Forms.

15. NEED DIGITAL LITERACY ON GOOGLE PLATFORMS

Digital literacy is crucial for teachers to engage students, create efficient learning experiences, and prepare them for future careers. Google's tools, such as Docs, Sheets, Classroom, and Forms, enable teachers to enhance collaboration, deliver interactive content, and personalize learning paths. Teachers need to integrate these tools meaningfully into their curriculum, fostering active learning and deeper understanding. Data privacy and online safety are essential, and teachers must be informed about responsible data handling, ethical technology use, and online security measures. Universities and educational institutions can offer courses and workshops to equip teachers with Google Platform skills and pedagogical strategies. Collaborative efforts between Google, educational institutions, and policymakers can drive effective strategies for fostering digital literacy skills in future educators.

16. IMPORTANCE OF DIGITAL LITERACY FOR TEACHERS

Equipping for 21st-century Education : In an increasingly digital world, teachers need strong digital literacy skills to effectively design, deliver, and assess learning experiences. This includes using technology tools, accessing and evaluating online resources, creating digital content, and fostering responsible online behaviour.

Enhancing Teaching and Learning : Digital tools can provide teachers with diverse pedagogical approaches, personalised learning opportunities, and real-time engagement for students. Skilled teachers can leverage technology to create interactive presentations, gamified learning, collaborative projects, and multimedia content.

Promoting Critical Thinking and Problem Solving : Digital literacy goes beyond technical skills. It's also about developing critical thinking, information literacy, and problem-solving skills in a digital context. Teachers can guide students to evaluate online sources, analyse data, and use technology creatively to solve real-world problems.

17. DIGITAL ENVIRONMENTS IN CLASSROOMS

Technology Integration : Integrating technology seamlessly into the curriculum is essential. This involves choosing appropriate tools, aligning them with learning objectives, and providing ongoing support for both teachers and students.

Digital Citizenship : Creating a safe and ethical digital learning environment is crucial. Teachers must educate students about online safety, digital etiquette, responsible information sharing, and cyberbullying prevention.

Equity and Access : Ensuring equitable access to technology and digital skills for all students is essential. This might involve addressing issues like socioeconomic disparities, accessibility needs, and providing necessary infrastructure.

18. CHALLENGES TO DIGITAL LITERACY

Overcoming Technophobia : Some prospective teachers may feel intimidated by

technology. Addressing their anxieties and providing appropriate support can help them overcome these challenges.

Bridging the Skills Gap : There might be a gap between the digital literacy skills of teachers and the expectations of the digital classroom. Providing targeted training and addressing specific skill needs is crucial.

Harnessing the Potential of Technology : Embracing technology as a tool for enhancing learning, not replacing traditional methods, is important. Balancing traditional and digital pedagogy effectively is key.

- Inadequate Organizational Change Management Approach
- Inadequate Knowledge
- The Constant Evolution of Customer Requirements
- Internal Opposition to Change
- Security Concerns
- Budget Constraints
- Cyber Security Risk
- Workforce Risk
- Cloud Risk

19. CONCLUSION

Prospective teachers are very essential to know digital literacy in all types of digital initiatives for their learning and teaching methods for the upliftment of future students. Prospective teachers also know about the library networks, INFLIBNET services, the National Digital Library of India and Google platforms, e-content portals, DIKSHA, NMEICT projects, and all other educational portals and projects for updating digital literacy in digital education methods and fields. Some of the digital environment tasks and challenges also faced by the prospective teachers and the teacher education institutions are eliminated, and the prospective teachers grow well in digital literacy programmes.

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