



Open and Digital Learning: Prospects and Challenges

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Editor

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Model Institute of Education & Research
Research and Development Cell
MIER College of Education (Autonomous)

Accredited by the NAAC with 'A+' Grade
Permanently Affiliated to the University of Jammu & Recognised by the Govt. of J&K

Published by
Model Institute of Education & Research
B.C. Road, Jammu 180 001

Open and Digital Learning: Prospects and Challenges
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ISBN: 978-81-952808-2-7

Printed at
Print & Copy Jammu 180 001
Email: contact@graphicsindiajammu.com

Preface

Education has witnessed a profound transformation in recent decades, driven by the rapid advancement of technology and the growing demand for flexible and accessible learning opportunities. The emergence of open and digital learning has reshaped the traditional educational landscape, offering innovative solutions to bridge the gaps in access, equity, and engagement. The growing importance of online platforms, blended learning models, and digital tools has created both opportunities and challenges for educators, learners, and policymakers worldwide.

Open and Digital Learning: Prospects and Challenges is a carefully curated collection of research papers presented at the conference on Open and Digital Learning, where distinguished educators, researchers, and practitioners shared their insights and experiences. This volume reflects the collective expertise and forward-thinking perspectives of these contributors, addressing a broad spectrum of issues, including the effectiveness of digital learning, the integration of technology in teaching, and the challenges of ensuring equitable access and engagement in a digitally connected world.

The book explores how open and digital learning models have revolutionised education by enhancing flexibility, personalisation, and global outreach. It examines best practices worldwide, evaluates the role of Massive Open Online Courses (MOOCs), and provides strategic recommendations for improving learner engagement and academic success. The diverse perspectives captured in this volume highlight the importance of balancing technological innovation with human-centred learning approaches to create inclusive and effective educational experiences.

We extend our sincere gratitude to all the contributors whose research and insights have enriched this publication. Special thanks to the organising committee, reviewers, and editorial team for their dedication and meticulous efforts in bringing this volume to fruition. We hope this book will be a valuable resource for educators, policymakers, and researchers, guiding them toward innovative and sustainable educational practices in the digital age.

We invite readers to engage with the ideas and perspectives presented in this volume, believing that the exploration of open and digital learning will continue to inspire meaningful advancements in global education.

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CHAPTER ONE

OPEN AND DIGITAL LEARNING: A NEW APPROACH IN THE EDUCATION SYSTEM

Aniruddha Lahiri

ABSTRACT

The intensifying demand for social and political accountability in education necessitates clear demonstrations of value for investment. This value manifests not only in the accessibility but also in the quality of education provided. Contemporary higher education witnesses a diverse student body varying in background, learning preferences, and educational needs, many of whom are adult learners seeking flexible educational delivery. This diversity underscores the relevance of open learning, a pedagogical approach that prioritises accessibility and tailors educational experiences to individual needs. The digital revolution has permeated all sectors, including education, where it addresses basic needs through technology and the internet. The shift towards digital learning tools, accelerated by recent global health crises, reflects this transformation. As digitalisation in education advances, it brings both opportunities and challenges. This paper investigates open learning's characteristics, benefits, and potential pitfalls, particularly the risks of its flexible methods being misused. Additionally, it evaluates the adoption and impact of digital learning technologies, which are increasingly integral to educational environments.

Keywords: Education, Open Learning, Digital Learning, Student, Teacher, Teaching

INTRODUCTION

The external environment in which India's higher education system operates is constantly evolving due to a technology-driven culture and the rising costs of maintaining universities and other higher education institutions. These changes influence both the national economy and the lives of citizens. The rapid growth of big data and information technology fields is significantly affecting the workforce, with increasing interaction between humans and machines. Modern universities must adapt to social, cultural, political, economic, and technological shifts while also focusing on enhancing employability skills. With reduced government funding for higher education, private institutions have gained equal footing, leading to their rise over state

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universities in recent years.

According to data from the University Grants Commission, the number of Open Universities continues to grow, currently totalling 334, compared to 399 State Universities and 48 Central Universities. One way to gauge the importance of Open Distance Learning (ODL) is to note that 15% of university students are enrolled in higher education through Open and Dual Mode Universities. ODL offers significant potential to reach millions of young people who cannot attend traditional institutions due to high cutoff percentages, as well as those who have had to halt their formal education due to social or economic challenges. While traditional campus-based learning is often regarded as superior to online degree programmes, improving the quality of education, incorporating advanced blended and digital learning methods, and taking other necessary steps could help shift public perception of open and dual-mode education universities.

A HISTORICAL VIEW OF THE DEVELOPMENT OF DISTANCE EDUCATION

According to the UNESCO Analytical Survey (October 2000) titled "Distance Education for the Information Society," the establishment of the Open University in the United Kingdom in 1969 played a pivotal role in inspiring the creation of distance learning institutions across various countries, particularly in Europe and Asia. Notable examples include Spain's Universidad Nacional de Educación a Distancia (UNED) in 1972, Pakistan's Allama Iqbal Open University (AIOU) in 1974, Thailand's Sukhothai Thammathirat Open University (STOU) in 1978, Korea's Korea National Open University (KNOU) in 1982, Indonesia's Universitas Terbuka (UT) in 1984, and India's Indira Gandhi National Open University (IGNOU) in 1985. After the closure of traditional universities during China's Cultural Revolution, the Central Radio and TV University (CRTVU) system was established in 1979, employing remote teaching methods via satellite broadcasting and provincial TV universities. The history of distance and correspondence learning showcases its adaptability, encompassing the diverse subjects taught, varied instructional methods, global expansion, and its response to social and historical challenges. Students in these programmes range from young children to older adults. Open and distance learning (ODL) presents advantages for both learners and those providing educational opportunities. It addresses challenges such as time and distance that typically hinder traditional education. ODL is particularly beneficial for (a) learners in remote areas unable or unwilling to attend a physical campus, and (b) situations where teachers in urban locations deliver education to students in rural areas, overcoming the barrier of geographical separation. This mode of learning can also tackle issues like low enrolment over extended periods or higher enrolment in one region compared to another. In the 1960s, policymakers sought ways to enhance education, making it more professional and accessible to all. Distance learning offered a viable solution for individuals wishing to study but lacking the time or resources for conventional education. As an alternative to traditional educational models, ODL enables students to learn independently with guidance from higher education institutions, significantly broadening the scope of educational delivery (Sikandar, 2019).

ODL upholds a comprehensive framework for high-quality education while enhancing flexibility in the learning paradigm. It removes the barriers of time and space. ODL reduces the cost of

education, promotes lifelong learning, assists individuals in obtaining additional credentials, and enables them to pursue their studies while working. In contrast to traditional schooling, online learning removes age and time restrictions while providing students access to a wide array of resources. One of the primary contributions of ODL is the inclusiveness of the educational system.

INSTITUTIONS OF OPEN AND DISTANCE LEARNING

- a) Single mode institutions: Prominent open universities specialising in offering open and distance learning programmes include the Indira Gandhi National Open University in India, Sukhothai Thammathirat Open University in Thailand, the Open University in the UK, and the Open Learning Agency in Canada. Like traditional universities, these institutions have departments dedicated to developing study materials, creating online content, and designing courses. Programmes are delivered through Study Centres, which Regional Centres manage. These centres employ academic staff, such as assistant regional directors or regional directors, who oversee contact programmes and ensure materials are distributed to enrolled students.
- b) Dual mode institutions: A dual-mode institution offers two learning options: a traditional classroom-based format and a distance-learning alternative. It may provide the same courses in both formats with identical assessments, but it may treat on-campus and remote learners differently. Furthermore, it might allow students to switch between the two modes of study. Examples of dual-mode Central Universities include Pondicherry University, Maulana Azad National Urdu University, and the University of Delhi. Separate departments manage these universities, such as the School of Open Learning or the Directorate of Distance Education. They collaborate closely with their respective teaching departments when designing curricula or developing courses while adhering to the regulations set by the relevant University Acts.
- c) Mixed Mode institutions: It offers maximum flexibility in terms of location and pace of learning. Students can select from a range of study methods, including independent study, group work, or a combination of the two. This strategy emerges from the "convergence" of in-person and distance learning modes and is increasingly adopted by institutions that were previously committed to either single or dual-mode learning. Examples of universities implementing mixed-mode learning include Deakin University and Murdoch University.

OPEN LEARNING CONCEPT

In 2014, the Ministry of Human Resource Development (MHRD) of the Government of India standardised educational terminology through the Indian Standard of Classification of Education (InSCED). In the 2017-18 All-India Survey Report on Higher Education (AISHE), the "Distance Mode" of Higher Education was defined as "the system of delivering education through methods such as broadcasting, telecasting, the internet, correspondence courses, seminars, contact programmes, or a combination of these communication channels." The terms "open and distance learning" and their definitions have gained significant recognition only in the past two decades. Various terms commonly associated with open and distance learning include correspondence education, continuing education, distance teaching, self-learning, adult education, technology-based or mediated education, learner-centred education, open learning, open access, flexible

learning, and distributed learning. Over time, open and distance learning has largely replaced traditional correspondence courses in many university programmes.

The Commonwealth of Learning (2015) defined and introduced many essential concepts and terminologies related to open and distance learning for Institutions offering Open Distance Education. They are:

- Distance education is a method of teaching and learning in which most educational interactions occur while the teacher and student are separated by space and/or time. Technology is employed to deliver learning content and facilitates face-to-face interactions between teachers and students as well as two-way didactic communication.
- Blended learning is a strategy to teaching and learning that shows how to combine various techniques, tools, and resources to enhance student learning
- Flexible learning gives students options for where, when, and how to learn.
- Open Distance Learning is an educational approach that involves the physical or temporal separation of the instructor and student. It includes the delivery of instructional content through various media, facilitates two-way communication, and typically incorporates occasional face-to-face sessions for tutorials and interactions between students and staff teachers.
- E-learning is a broad term encompassing learning design approaches that integrate the best aspects of blended and flexible learning to increase student engagement and improve learning outcomes.
- Massive Open Online Courses are online courses that may be enrolled in bulk on the open web. The term "open" often refers to open registration rather than courses licensed under an open license.
- Online learning refers to an educational method that requires students to connect to a digital network to access various learning materials and services. It involves network-based teaching that enhances interaction among students, instructors, and the subject matter.

DIGITAL LEARNING

Digital learning is learning supported by digital technology or instructional strategies that fully utilise digital technology. Every educational domain and setting experiences digital learning, which provides mutually beneficial outcomes for all parties involved. While schools, colleges, and other educational institutions witness a rise in enrolment and additional revenue, students view it as a flexible alternative that enables them to study at their preferred time and location.

In India, the field of digital education is developing more rapidly each year. The use of visual effects, graphics, 3-D models, and various resources makes complex concepts and theories easier for students to understand. We observe that as educational institutions increasingly embrace

digital solutions, the traditional chalk-and-talk approach has been gradually replaced by more interactive teaching methods. Students today are more engaged in digital learning, as they are accustomed to using computers, iPads, and mobile phones. In the realm of digital education, several public and private entities exist, including e-Pathshala by NCERT, DIKSHA by MHRD, and private educational platforms like Tata Class Edge, BYJU'S, and others. Students benefit from digital education by acquiring practical and technological skills alongside academic knowledge. Additionally, the location and timing of learning are not restricted. Students have ample time to grasp the material, and learning can be made more participatory and interesting for both educators and learners. This type of education is cost-effective and attracts a large number of students. Learners who utilise technology and digital resources are more engaged and eager to study. They learn through interactive methods such as mind mapping, gamification, peer education, teamwork, problem-solving, reverse teaching, role-playing, and storytelling. Students who leverage technology and learning resources can cultivate effective, independent learning abilities. Two essential qualities that contribute to the development of a successful professional are teamwork and communication skills. Digital tools are also crucial for enhancing these skills (Channappa et al., 2022).

Digital Learning Strategy:

The digital learning strategies are as follows (Naresh, 2021):

- Adaptive learning and Blended learning
- Classroom technologies and E-textbooks
- Learning analytics and Learning objects
- Mobile learning: e.g. Mobile Phones, Laptops, Computers, iPads.
- Personalised learning
- E-learning or online learning and Open educational resources (OERs)
- Technology-enhanced teaching and learning

Digital Learning Pedagogies:

Some common pedagogies, or practices of teaching, that combine technology and learning are:

- Blended/hybrid learning
- Online learning
- Flipped learning
- 1:1 learning
- Differentiated learning
- Individualised learning
- Personalised learning
- Understanding Intentionally (UBD)
- Universal Design for Learning (UDL)

Digital Learning Tools and Resources:

There are many tools and resources available on the internet which are used to improve and build a virtual classroom. Teachers in the twenty-first century can utilise the materials and equipment listed below for digital learning (Naresh, 2021):

- Google class
- RSS or Social Readers
- Google+ Communities
- Cloud-based Word Processors (i.e. Google Drive)
- File-sharing platforms.
- Evernote
- Digital Pocket
- Zotero

Alteration of Learning from Open Platform to Digital Platform: The ICT-Based Student Support as an Alternative to Traditional Student Support

The Indian government's Ministry of Human Resource Development has set a goal for a Gross Enrolment Ratio (GER) of 40% by 2024. It is inevitable that the Open and Distance Learning (ODL) system will need to adopt a learner-centric approach alongside a technology-enabled online education system as it takes on a larger role. The primary drivers of this transformation may be characterised as a shift from traditional to ICT-based student assistance, a transition from printed Self-Learning Materials (SLMs) to digital SLMs, a change from in-person counselling to a four-quadrant support model (e-tutorial, e-content, online resources, and self-assessment), an evolution from the three-tier Conventional ODL system to a two-tier ICT-based Learner Support System, an enhancement of ODL system training and capacity for online programmes and courses, and a conversion from pen-and-paper systems to online assignments and examination reforms. The utilisation of Open Educational Resources (OERs) instead of Copyright Materials, alongside replacing Physical Laboratories with Virtual Science and Skill Laboratories for skill development, and the shift from ODL Regulations to Online/MOOC Regulations, are also crucial. Lastly, programme revisions are transitioning from a periodic to a continuous approach (Rao, 2020).

Both dual-mode and open universities must consider options beyond traditional Learner Support Centres (LSCs) to enhance access to education. Since traditional LSCs possess the authorised capacity to allocate learners according to their needs, their management and operation require specialised personnel and ongoing oversight in accordance with UGC ODL Guidelines. ODL colleges need to shift from conventional student assistance to ICT-based student support to serve a larger student population better. These are the main components that form this suggestion change:

- A. From in-person to audio-visual counselling: It will serve as an alternative to traditional face-to-face counselling based on LSCs. The university's faculty will broadcast live lectures via television and radio channels, with the option for live streaming, as part of the TV/radio-based

web counselling. Recorded copies of these lectures may then be made available online for students who were unable to participate in the web-based counselling to utilise at a later time. In other words, ICT-based therapy might replace in-person counselling. Web-based counselling would undoubtedly benefit from the widespread use of FM radio channels Gyan Vani and 24x7 educational television channels Gyan Darshan. Furthermore, the MHRD's SWAYAMPRAKASH Channels may be suitably configured to provide electronic counselling for ODL mode learners.

- B. From Conventional LSC to Smart Classrooms: According to ODL Regulations, conventional LSCs lack the adequate infrastructure to accommodate the authorised number of students. The host institutions must be consulted in a timely manner before embarking on a systematic effort to enhance the LSC infrastructure to transform them into digital or smart LSCs. In addition to the infrastructure present at traditional LSCs, the modernised LSCs may require satellite dishes, digital boards, smart TVs, and broadband access. Smart LSCs will be advantageous in expanding the student base of ODL mode colleges, as they can accommodate more learners than traditional LSCs. While traditional LSCs may still function in remote and challenging locations where digital connectivity poses a major concern, internet access remains the primary factor limiting the effectiveness of smart classrooms.
- C. Online Admissions: The two main benefits of a technological interface are cost-effectiveness and transparency. By integrating an online payment gateway system, ODL institutions will move towards total automation of the admissions process. Potential candidates for admission to the ODL system will contribute to the demand, which can only be managed by a robust online admissions system supported by a cloud server. Students will receive all post-admission-related information, digital Student Identity Cards, and admission confirmations through this method. To facilitate admissions at the door, a learner-friendly app will also be available for the entire online admissions process. ODL institutions should envision and create a specific, shared online admissions framework that is integrated with the admissions processes of all open universities.
- D. Transformation from Conventional to Digital Libraries: The Central Library at the institution and the libraries at the regional centres are the two primary locations where users of the traditional ODL system can access learning resources. However, ODL institutions must work diligently to ensure that learner support centres have access to libraries. Two significant factors contributing to ODL learners' disengagement from libraries are limited access to the most current editions of books and periodicals, along with decreasing financial resources. Learning materials are now available through digital libraries or digital labs in various formats, including text, photographs, social media files, audio and video files, e-books, online journals, and more, due to the increasing integration of technology. The main advantage of digital libraries is the capacity to store learning resource information digitally in a central location, such as at ODL institutions, and to provide remote access to all learner support centres, ensuring interoperability, sustainability, and cost-effectiveness. From the perspective of ODL, these digital libraries are ideal for ICT-based student support as they do not require physical space, are accessible 24/7, and facilitate rapid information access retrieval.

FUTURE PROSPECTS OF OPEN AND DIGITAL LEARNING

New formats and aspects of distance learning are emerging due to the current realities surrounding the education of contemporary students worldwide. Distance learning facilitates using advanced techniques, resources, and instructional aids that rely on electronic information technology within the educational process. One of the course's primary goals is to develop personalised approaches for each student based on their academic background, logical reasoning, and other characteristics. The second vital responsibility is to create the best possible environment for students to fulfil their cognitive needs and seek new knowledge in their areas of interest within the academic field. The fundamental element of the third task, which logically follows from the second, is the ability to argue. The study found that the argumentation model serves as an active means for students to engage in learning, helping them to become more genuine versions of themselves (Mircea, 2014).

A highly effective way to expand educational opportunities for semi-adult and adult populations in developing countries is through Open and Distance Learning (ODL) within primary and secondary education. ODL has the potential to foster innovative teaching and learning models. Evidence indicates that ODL can enhance creativity in traditional education and may even affect aspects beyond the classroom. Consequently, ODL is essential for the development of a global knowledge-based society.

UNESCO plays a vital role in supporting the ODL system through international collaboration, providing both technical and intellectual assistance. Promoting open and distance learning underscores the significance of international, interregional, and regional partnerships. Some of these initiatives include raising awareness, fostering confidence, building capacity, analysing both successful and unsuccessful experiences, connecting key figures in distance education and educational technology, piloting and adapting educational technologies, co-developing learning systems and materials, conducting exchanges and joint ventures between countries, evaluating technology, analysing costs and impacts of alternative delivery systems, and supporting the development of comprehensive policies and plans for new educational technologies. Collaboration is sought with non-governmental organisations, such as the International Council for Open and Distance Education (ICDE), public and private sector partners, the Commonwealth of Learning, the World Bank, the European Union, the Organisation for Economic Cooperation and Development, and other intergovernmental organisations. Technological advancements could significantly alter the future of learning and collaborative work. The ODL system is rapidly gaining attention and is anticipated to eventually dominate the entire education and training landscape (Ghosh et al., 2012).

The advent of the Internet and associated networks, including the World Wide Web, has had and will continue to profoundly impact the transformation of education and training across all domains. All industrialised nations have already felt the effects, and most developing countries strive to engage in the expanding global educational community despite various obstacles and anxieties. The Web provides an international platform for teaching courses that can be dynamically updated in ways previously unimaginable. For learners, there are no boundaries in terms of time or location when it comes to resources. With the aid of these resources, students'

learning experiences are evolving, and new developments in networked learning are emerging. Although the World Wide Web and the Internet are predominantly used in higher education for open and remote learning, schools are also beginning to adopt them.

The shortage of teachers and the inadequacy of appropriate teaching resources have been addressed by the ease with which online learning platforms and technologies have introduced innovative, collaborative, and flexible educational methods. As internet access becomes more affordable and widespread, there will be an increasing integration and reliance between digital and traditional teaching methodologies. In the near future, a surge of small and medium-sized Edu-tech start-ups will emerge in the education sector, offering educational institutions various innovative digital solutions. Furthermore, the government is taking swift action to pass legislation encouraging the growth of the country's digital education sector. The primary aim is to enhance the nation's digital infrastructure to ensure that advanced teaching resources are more accessible.

CONCLUSION

The ODL approach can be extremely helpful in maximising learners' potential across various domains. Distance and open learning can shape and serve as a guiding force for remote learners, igniting their dormant learning impulses. Over the last 40 years, open and distance learning has gained credibility as a viable alternative to traditional higher education, significantly improving access to high-quality education in India. ODL colleges have successfully transformed ODL into multimodal, technologically assisted education. Online technologies are aiding ODL institutions in creating a collaborative framework for the design, development, and sharing of digital resources, which in turn is lowering costs. In the near future, with the internet becoming more widely available and affordable, digital education will likely replace traditional classroom instruction. Small, medium, and large-scale digital learning start-ups providing cutting-edge digital products supporting digital learning will proliferate in the education sector. Additionally, the government is facilitating this by formulating regulations that will stimulate the nation's digital education industry. Across the nation, efforts are underway to enhance the standard of digital infrastructure by applying advanced teaching resources (Varyani & M S, 2020).

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CHAPTER TWO

EFFECTIVENESS AND CHALLENGES OF ONLINE DIGITAL LEARNING: A COMPREHENSIVE REVIEW

Arpana Koul

ABSTRACT

This comprehensive review thoroughly examines the multifaceted impact of online digital learning on education, delving into its effectiveness and associated challenges. It rigorously analyses scholarly articles, reports, and case studies to provide a holistic understanding of this innovative educational paradigm. The review elucidates how online digital learning enhances accessibility, flexibility, and learner engagement while facilitating personalised learning experiences and promoting student success. It also scrutinises its impact on academic performance and acquiring essential 21st-century skills. Conversely, the paper addresses challenges related to digital literacy, equity, the digital divide, and concerns about educational quality, underlining the necessity for effective pedagogical strategies, teacher training, and infrastructure support to mitigate these issues. Furthermore, it explores the interplay between effectiveness and challenges, emphasising the importance of a balanced approach to harness the potential of online digital learning fully. Critical factors influencing the success of online education programs, such as learner motivation, instructional design, and ongoing assessment, are also discussed.

Keywords: Online digital learning, Accessibility, Learner Engagement, Personalized Learning

INTRODUCTION

Online digital learning has transformed education, offering flexibility and accessibility to learners worldwide. Online digital learning refers to using digital technologies, such as the Internet and various electronic devices, to deliver educational content and facilitate learning. It involves accessing courses, resources, and interactive materials through online platforms, allowing learners to study remotely and often at their own pace. Online digital learning, often e-learning or virtual education, has become integral to the modern educational landscape. The advent of

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digital technology has revolutionised the way students access and engage with academic content. Online digital learning has revolutionised the education landscape, offering unprecedented opportunities for accessibility, flexibility, and personalised learning experiences. In the contemporary educational landscape, online digital learning has emerged as a transformative force, reshaping the traditional notions of teaching and learning. Online digital learning has become a ubiquitous mode of education, especially in the wake of the COVID-19 pandemic.

The development of advanced intelligent electronic devices and applications in the twenty-first century has made the World Wide Web a learning platform and easy dissemination of information. Idoko and Palmer, 2023 explored some of the challenges encountered using Virtual E-Learning Systems and proposed recommendations to address some of these challenges. VE-LS has been a medium through which tutors pass knowledge by training students non-physically. This has created possibilities as it enhances efficiency, which traditional education and tutoring could not. The COVID-19 pandemic disrupted many learning activities over the years; this made academic institutions merge conventional (face-to-face) and online virtual learning. An instructor leads this process engagingly to facilitate learning activities and assist with problem-solving. However, several technological challenges were encountered as most users were novices and needed to learn how to use such systems.

One of the fundamental components of the United Nations' Sustainable Development 2030 agenda is quality education. It aims to ensure inclusive and equitable quality education for all. Digital technologies have emerged as an essential tool to achieve this goal. These technologies are simple to detect emissions sources, prevent additional damage through improved energy efficiency and lower-carbon alternatives to fossil fuels, and even remove surplus greenhouse gases from the environment. Digital technologies strive to reduce pollution and waste while increasing production and efficiency. These technologies have shown a powerful impact on the education system. The recent COVID-19 Pandemic has further institutionalised the applications of digital technologies in education. These digital technologies have made a paradigm shift in the entire education system. It is not only a knowledge provider but also a co-creator of information, a mentor, and an assessor. Technological improvements in education have made life easier for students. Instead of pen and paper, students use various software and tools to create presentations and projects. When compared to a stack of notebooks, an iPad is relatively light. When opposed to a weighty book, surfing an E-book is easier. These methods aid in increasing interest in research. (Haleem, Javaid, Qadri, & Suman, 2022)

Basar, Mansor, Jamaludin, and Alias 2021, the COVID-19 pandemic has forced an immediate implementation of online learning. However, more is needed to know about its effectiveness and the challenges the students face. Thus, his study aims to examine the effectiveness of online learning and the challenges it presents to pupils' abilities to learn. His study employed a case study design using a survey questionnaire administered to 99 students from a secondary school in Jasin, Melaka. Data were analysed descriptively (calculation of percentage and frequency). Generally, the findings indicated that the students have computers or smartphones and an internet connection at home. Besides, it was found that the ability and comfortability to use computers was high (>93%). However, their motivation in online learning was low (41.5%), and their ability

to work in a group was moderate (66.7%). They also agreed that conventional teaching (face-to-face) was necessary for their learning (98%). These findings are valuable for the government, school administrators, teachers and parents to acknowledge the importance of well-equipped facilities and a stable internet connection for effective learning.

The COVID-19 pandemic has wreaked havoc on every aspect of society. It has caused profound disruption to the education system as governments worldwide have temporarily closed educational institutions to contain the spread of the coronavirus. Face-to-face classes have been cancelled and moved online, bringing about the rise of online learning that has allowed learners to continue their education. However, the sudden transition from face-to-face to online learning has posed numerous challenges for students, teachers, administrators, and education leaders. Drawing on previously published sources, this article first attempts to explain different terms used to describe online learning. It then discusses critical challenges posed by the widespread adoption of online learning during the pandemic, followed by a discussion of suggestions made by different researchers to enhance the effectiveness of online learning. The article concludes with a summary of critical challenges, suggestions, and brief recommendations for the broader adoption of online and blended learning in the post-COVID-19 world. (Heng & Sol (2021).

This comprehensive review paper examines the effectiveness of online digital learning, discussing its benefits, challenges, and prospects. We explore the impact of online learning on students' academic performance, engagement, and satisfaction, as well as its potential to bridge educational gaps. Additionally, this paper addresses critical challenges associated with online learning, including technology, equity, and pedagogical adaptation issues. It is enhancing its efficacy. The study synthesises existing literature, highlighting the advantages and disadvantages of digital learning, its impact on students and educators, and its technological, pedagogical, and socio-economic challenges. The paper concludes by offering recommendations for improving the effectiveness of online digital learning and addressing its challenges.

EFFECTIVENESS OF ONLINE DIGITAL LEARNING

1. Academic Performance

Online digital learning can significantly improve academic performance. Numerous studies have shown that well-designed online courses can be equally or even more effective than traditional classroom-based instruction. A meta-analysis conducted by the U.S. Department of Education (2010) found that students in online learning environments performed better than those receiving face-to-face instruction on average.

2. Engagement and Motivation

Engagement and motivation are key factors in the effectiveness of online learning. Digital platforms can offer a variety of interactive and multimedia resources, contributing to a more engaging learning experience. However, maintaining student motivation and ensuring active participation can be challenging without face-to-face interactions.

3. Accessibility and Flexibility

Online learning provides learners with unparalleled accessibility and flexibility. Students can conveniently access course materials and engage in learning activities, breaking down geographical barriers. This flexibility is particularly advantageous for working professionals, non-traditional students, and those with physical disabilities. Online digital learning allows learners flexibility regarding when and where to access educational content. This feature particularly benefits non-traditional students, working adults, and those with geographical constraints. Digital learning resources are available 24/7, enabling learners to study independently.

4. Satisfaction and Student Preferences

Research indicates that many students are satisfied with online learning experiences. A survey conducted by the Babson Survey Group (2019) found that approximately 85% of students who had experienced online courses expressed satisfaction with the format. However, individual preferences and satisfaction may vary, with some students finding face-to-face interaction more appealing.

5. Bridging Educational Gaps

Online digital learning has the potential to bridge educational gaps by providing access to high-quality educational resources to underserved populations, both domestically and internationally. This makes education more equitable and inclusive.

6. Personalization and Adaptation

Digital learning platforms often incorporate adaptive learning technologies that tailor the educational content to individual students' needs. This personalisation can enhance the learning experience by catering to different learning styles and paces.

7. Cost-Efficiency

Online courses are often more cost-effective than traditional in-person education, eliminating the need for physical facilities and reducing transportation and accommodation costs. This affordability can make education more accessible to a broader range of students.

8. Global Reach

Online learning transcends geographical boundaries, allowing students to access courses and programs offered by institutions worldwide. This global reach expands opportunities for cross-cultural learning and collaboration.

CHALLENGES OF ONLINE DIGITAL LEARNING

1. Technology Infrastructure

Effective online learning relies on reliable technology infrastructure. Access to high-speed internet, computers, and software applications can be uneven, particularly in remote or low-income areas. This digital divide can inhibit students' access to online education.

2. Equity and Inclusivity

Ensuring equitable access to online education is a significant challenge. Students from marginalised backgrounds may need help with online learning, including limited access to technology and digital literacy. Addressing these equity concerns is crucial to the success of online education.

3. Pedagogical Adaptation

Adapting teaching methods to online environments can be challenging for educators. Effective online instruction requires different pedagogical approaches, strategies, and tools. Faculty development and support are essential for helping educators make this transition successfully.

4. Assessment and Academic Integrity

Online assessments present unique challenges in maintaining academic integrity. Cheating and plagiarism are more difficult to prevent and detect in digital environments. Developing secure assessment methods and promoting academic honesty are ongoing challenges.

5. Technical Issues

Technical difficulties, such as software compatibility problems, device compatibility issues, and learning management system glitches, can disrupt the learning process and frustrate students and educators.

6. Digital Literacy

Students and educators must possess digital literacy skills to navigate online learning platforms effectively. A lack of digital literacy can hinder participation and learning outcomes.

7. Engagement and Motivation

Online digital learning often needs more in-person social interaction that can enhance student engagement and motivation. Maintaining focus and self-discipline can be challenging for some learners.

8. Assessment and Evaluation

Designing practical online assessments and ensuring their integrity can be complex. Educators must address cheating and plagiarism issues while accurately evaluating student performance.

9. Socio-Economic

Challenges Equity and Inclusion Online learning can exacerbate educational inequalities, as students from disadvantaged backgrounds may lack the necessary technology and resources.

10. Isolation and Mental Health

The absence of physical and social interactions in online learning can lead to feelings of isolation, loneliness, and mental health issues, impacting student well-being and academic performance.

FUTURE PROSPECTS OF ONLINE DIGITAL LEARNING

The future of online digital learning holds promise. Advancements in technology, artificial intelligence, and learning analytics will enhance personalisation and adaptive learning. Blended learning, combining online and in-person instruction, will likely become more prevalent, providing a balanced educational experience.

Online digital learning can empower students to take control of their education, but it may also lead to feelings of isolation and disconnection. The ability to balance self-paced learning with structured guidance can affect academic success. Educators may need to adapt their teaching methods and acquire new technological skills to engage students online effectively. They also face the challenge of maintaining academic integrity and fostering community in virtual classrooms.

RECOMMENDATIONS

To maximise the effectiveness of online digital learning while addressing its challenges, it is essential to:

1. **Expand Internet Access:** Governments and institutions should invest in expanding Internet access to underserved areas.
2. **Digital Literacy Training:** Schools and universities should offer digital literacy training programs to ensure students and educators are proficient in using online tools.
3. **Hybrid Approaches:** Combining in-person and online learning can offer the benefits of both modalities while addressing some of the challenges.
4. **Social and Emotional Support:** Educational institutions should prioritise students' mental health and well-being through counselling services and support networks.

To enhance the effectiveness of online digital learning and mitigate its challenges, the following recommendations are proposed:

- Invest in technology infrastructure to bridge the digital divide.
- Provide comprehensive faculty training in online pedagogy.
- Promote research on best practices for online education.
- Develop inclusive policies that ensure equitable access.
- Implement secure and innovative assessment methods.
- Foster partnerships between educational institutions and companies to enhance the quality of online learning resources.

CONCLUSION

Online digital learning has become crucial to the educational landscape, offering significant benefits and challenges. Understanding its effectiveness and challenges is vital for educators, policymakers, and stakeholders. By addressing the challenges and capitalising on the potential of online learning, we can create a more equitable and efficient educational system for the future. This comprehensive review has analysed its effectiveness, highlighting its advantages in flexibility, personalisation, and global reach, as well as the challenges related to technology, pedagogy, and socio-economic factors. To maximise the benefits of online learning and address its limitations, a holistic approach that encompasses improved infrastructure, digital literacy, and support mechanisms for students and educators is required.

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CHAPTER THREE

BEST PRACTICES IN OPEN AND DIGITAL LEARNING AROUND THE WORLD

Bindu Dua and Shivali Kallu

ABSTRACT

Technology is a broad and encompassing term that refers to applying scientific knowledge for practical purposes. It includes tools, machines, devices, systems, and methods developed to solve problems, accomplish tasks, and improve various aspects of human life. Technology is at the heart of human innovation and progress. It has fuelled advancements in multiple fields, from healthcare and transportation to communication and education, improving quality of life. Open and digital learning, often called online learning or e-learning, represents a mode of schooling that leverages digital technologies to provide flexible, accessible, and usually interactive learning experiences. These approaches are transforming education in various ways, making it more inclusive, personalised, and adaptable to the demands of the digital age. It eliminates geographic and time barriers to education. Learners can access educational content and resources from anywhere with an internet connection. This mainly benefits individuals facing physical or logistical challenges in attending traditional classrooms. Open and digital learning can take many forms, including massive open online courses (MOOCs), online degree programs, virtual classrooms, and digital learning platforms. These approaches have been particularly significant in responding to the educational needs arising from the digital revolution, making learning more accessible and adaptable to the needs of the 21st century. The present paper highlights open and digital innovations that have a profound impact on the field of education and have transformed the way people access, deliver, and engage with educational content.

Keywords: Technology, Open and Digital Learning, Massive Open Online Courses (MOOCs)

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INTRODUCTION

Our future will be dominated by automation and artificial intelligence (AI). To live and prosper, the next generation of citizens and the labour force must be proficient in a wide range of technology. Because of this, technology must be integrated into classrooms in a high-quality way to help develop the necessary abilities. UNESCO (2020), for example, emphasises that a core aim of education should be to prepare young generations to become future-ready.

Despite the advancement in technology innovation and adoption in industry and society, the education sector – as demonstrated by its impressive response to COVID-19 - has been playing catch-up in implementing technology to rethink and refocus teaching and learning. Building on this success, the ongoing integration of digital technologies and AI in education must continue to target primary, secondary and higher education to make knowledge and experience of these advanced technologies accessible to the most diverse group of students in our society (Williams, Kaputso & Breazeal 2021). A lack of skills in emerging technologies could limit people's ability to participate in society and compete in the labour market (Tuomi 2018). According to Oke and Fernandes (2020), Industry 4.0 and its disruptive technology will significantly affect education and training. Even though this presents an opportunity to improve how we teach, learn, work, and interact, it is necessary to understand the facilitating conditions, needs, and capabilities of teachers and the schooling system. An effective education system should help students deal with the rapid development of technologies and continuous access to vast amounts of new knowledge and information while fostering critical thinking, sense-making, creativity, and collaboration skills. To ensure this can happen, governments and schools require a digital strategy that offers guidance on implementing digital systems, technologies, learning design, and pedagogy while providing a basis for benchmarking performance against evidence-based criteria.

In this paper, we review the use of Best Practices in Open and Digital Learning around the World.

THE CONCEPT OF OPEN AND DIGITAL LEARNING AROUND THE WORLD

- **Accessibility:** Open and digital learning aims to make education universally accessible. Through online platforms, educational resources, and digital technologies, learners can engage with academic content regardless of geographical location, socioeconomic status, or physical constraints. This accessibility democratises education, offering opportunities to diverse populations.
- **Flexibility:** Flexibility is a hallmark of open and digital learning. Learners can choose when, where, and how they engage with educational materials. This flexibility accommodates various learning styles, allowing individuals to balance their academic pursuits with work, family, or other commitments. Asynchronous learning, self-paced courses, and modular content contribute to this flexibility.
- **Technology Integration:** The seamless integration of technology into educational practices is central to open and digital learning. Digital tools, multimedia resources, virtual classrooms, and interactive platforms enhance the learning experience. Technology

facilitates communication, collaboration, and engagement, transforming traditional teaching methods and fostering innovation in pedagogy.

- **Open Educational Resources (OER):** Open educational resources are fundamental to open learning. These freely accessible, openly licensed materials include textbooks, lectures, quizzes, and more. OER promotes cost-effective education by eliminating the need for expensive textbooks, fostering collaboration in content creation, and ensuring that knowledge is freely available to all.
- **Massive Open Online Courses (MOOCs):** MOOCs exemplify the scalability of open and digital learning. These online courses, often offered by prestigious institutions, allow many learners to enrol simultaneously. MOOCs provide an interactive and engaging learning environment, enabling participants to access high-quality content, engage in discussions, and receive certificates upon completion.
- **Personalised Learning:** Digital learning platforms employ adaptive technologies and data analytics to personalise the learning experience. This approach maximises engagement and comprehension by tailoring content, pace, and assessments to individual learner needs. It recognises and accommodates students' diverse learning styles and preferences.
- **Lifelong Learning:** Open and digital learning promotes a culture of lifelong learning, acknowledging that education is not confined to a specific period of life. Individuals can continually update their skills, acquire new knowledge, and adapt to societal and professional requirements. Lifelong learning is facilitated by easy access to online resources and courses.
- **Collaboration and Global Connectivity:** Digital learning fosters collaboration and global connectivity. Through collaborative tools, discussion forums, and virtual group projects, learners can connect with peers, educators, and experts from around the world. This interconnectedness promotes cross-cultural understanding and the exchange of diverse perspectives.
- **Assessments and Credentials:** Digital learning transforms the assessment and credentialing process. Online assessments, ranging from quizzes to project-based evaluations, provide immediate feedback. Digital badges and certificates offer alternative credentials that recognise and validate skills acquired through online learning experiences, complementing traditional qualifications.

BEST PRACTICES IN OPEN AND DIGITAL LEARNING AROUND THE WORLD

- **Open Educational Resources (OER):** Open Educational Resources are freely accessible, openly licensed materials that support teaching, learning, and research. Best practices in OER include collaborative content creation, clear licensing frameworks, and the development of repositories for easy access and sharing.

- **Massive Open Online Courses (MOOCs):** MOOCs have become a scalable solution for delivering quality education globally. Best practices in MOOC development involve interactive content, engaging assessments, and fostering a sense of community through discussion forums and peer collaboration.
- **Blended Learning:** Blended learning combines traditional face-to-face instruction with online learning components. Successful implementations involve thoughtful curriculum design, integration of digital tools, and ongoing professional development for educators.
- **Learner-Centred Approaches:** Best practices prioritise learner needs, preferences, and diverse learning styles. Personalised learning paths, adaptive technologies, and real-world applications enhance engagement and knowledge retention.
- **The Open University (UK):** The Open University has pioneered open and distance learning, utilising innovative pedagogies, OER, and digital platforms to educate a diverse global audience.
- **Coursera:** Coursera, a leading MOOC platform, employs best practices in content delivery, interactive assessments, and industry partnerships to offer various courses and specialisations.

DIGITAL LEARNING PLATFORMS

Digital learning platforms allow students to learn through digital, distance, and e-learning models. Some of these platforms include:

Coursera: Offers a wide range of courses from universities and institutions worldwide. Users can access video lectures, quizzes, and assignments. Certificates are awarded upon course completion.

edX: Similar to Coursera, edX provides global courses from universities and institutions. It emphasises collaboration and offers verified certificates for completed courses.

Khan Academy: A non-profit platform providing free educational content through video lessons, practice exercises, and a personalised learning dashboard. It covers a wide range of subjects.

Udacity: Focuses on tech-related courses and nano-degree programs. It offers project-based learning and mentorship to enhance practical skills.

LinkedIn Learning: Formerly known as Lynda.com, this platform provides video courses on various professional skills, including business, technology, and creative subjects.

MIT OpenCourseWare: The Massachusetts Institute of Technology offers free access to various course materials, including lecture notes, assignments, and exams.

OpenStax: A nonprofit organisation that provides free, peer-reviewed, openly licensed textbooks suitable for college courses.

Google Classroom: Designed for educators, Google Classroom facilitates the organisation and distribution of assignments, feedback, and collaboration among students.

These platforms exemplify the diverse range of open and digital learning tools, each catering to specific educational needs and preferences. As technology advances, the landscape of open and digital learning platforms is likely to evolve, offering even more innovative and inclusive educational experiences.

CHALLENGES IN OPEN AND DIGITAL LEARNING

1. Access to Technology: Open and digital learning relies heavily on technology, which can be a limitation for those who need access to reliable internet or devices.

2. Technological skills: Some individuals may need more skills to effectively navigate online learning platforms or use digital tools, which can hinder their learning experience.

3. Digital Divide: The digital divide refers to the gap between those with access to technology and those without access. This divide can limit the reach of open and digital learning, particularly in disadvantaged communities.

4. Lack of Personal Interaction: Open and digital learning often needs more face-to-face interaction in traditional classrooms. This can make it challenging for some learners who thrive in a social learning environment.

5. Self-Motivation and Discipline: Open and digital learning require self-motivation and discipline to stay on track with coursework and deadlines. However, some learners may be able to stay engaged and focused with the structure of a physical classroom.

6. Limited hands-on experience: Certain subjects, such as science or practical skills, may require hands-on experience that is difficult to replicate online.

RECOMMENDATIONS

Open and digital innovations play a crucial role in addressing the challenges of today by fostering a more holistic approach. Here are some key ways in which these innovations can be utilised:

- *Tackling digital inequalities by addressing the digital divides:* Inequalities in the digital domain can reinforce existing socio-economic inequalities (DiMaggio & Garip 2012). Many factors shape digital disparities, including access to digital devices, a reliable internet connection, skills and usage patterns. Therefore, education systems must develop policies to address these issues simultaneously when targeting digital divides (Burns & Gottschalk 2019; van Deursen & Helsper 2018). Tackling digital divides helps improve

inclusiveness and avoid growing inequalities caused by digital transformation (OECD 2019).

- *Improving teacher self-efficacy with continuing professional development:* An important and often overlooked consideration when implementing digital technologies in the classroom is teachers' self-efficacy. Teachers who are not confident using digital technologies in their work will avoid using them and instead engage in traditional activities with which they may have experienced previous success (Becta 2004; Pajares and Schunk 2002). Teachers' attitudes, social identities, perceived competence, and confidence levels have all been identified as factors that influence teachers' voluntary participation in ICT use (Hennessy, Ruthven, & Brindley 2005). Teachers' lack of confidence stems from, among other sources, fear of failure and their actual and perceived limitations in ICT knowledge (Beggs 2000; Balanskat et al. 2006). Studies have demonstrated that teachers' self-efficacy can be improved by completing educational ICT courses, highlighting the importance of high-quality and relevant professional development (Pan and Franklin 2011).
- *Avoid reform fatigue by increasing stakeholder involvement:* Attitudes towards innovation are critical for determining the success and effectiveness of the uptake of new initiatives (Katz 2018; Knezek & Christensen 2018). New reforms often generate a range of emotions and responses from stakeholders. Research suggests that change can be a source of anxiety for those involved in the process (Hall and Hord 1987). The level of anxiety experienced may depend on the extent to which an individual believes the change will impact them personally (Hargreaves 2004) and whether the innovation aligns with their attitudes and beliefs (Carless 1997). Reform fatigue can compromise the successful implementation of new educational reforms and happens when changes and adjustments to the curriculum occur too frequently (Dilkes et al. 2014). This fatigue is often apparent when policy changes are made before previous reforms have been embedded into practice or when teachers are made to deal with successive, contradictory reforms (OECD 2020a). When education practitioners navigate new reforms that impact their practice, they can experience frustration, disillusionment, and fatigue, resulting in resistance to change over time (MacDonald et al., 2019). Resistance to change can prevent the successful integration of digital technologies in the classroom (Becta 2004; Cuban et al. 2001). To successfully implement new reforms, those who are most affected must be able to see the value that comes from change (Hargreaves 2002). Individuals are likelier to take ownership of new initiatives, increasing the potential for successful reform outcomes (Flanagan & Jacobsen 2003).

CONCLUSION

High-performing public education systems take an intentional and multi-faceted approach to integrating digital technologies for teaching and learning. Best practices in open and digital learning are dynamic and context-dependent, requiring ongoing adaptation to technological advancements and the evolving needs of learners. While most countries and jurisdictions

reviewed in this article have made remarkable efforts to close the first digital divide, tackling the second divide remains a high priority for most of them. Many successful approaches have focused on promoting digital skills and inclusion by developing targeted programs for disadvantaged students. By examining successful initiatives and learning from global experiences, educators and policymakers can contribute to advancing inclusive, accessible, and high-quality education for all.

To conclude, this review presents insights from best practices in the transformational adoption of technology in education. These recommendations can inform the development and implementation of new digital education policies. Open and digital learning represents a progressive shift in education, emphasising accessibility, flexibility, and technology integration to create inclusive and learner-centric educational experiences. This evolving approach reflects the transformative potential of technology in shaping the future of education.

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CHAPTER FOUR

DIGITAL EDUCATION SYSTEMS: EXPANDING ACCESS THROUGH MOOCS

Eesha Sharma and Sandeep Kour

ABSTRACT

Digital Education Systems, mainly Massive Open Online Courses (MOOCs), have emerged as transformative tools in expanding access to education worldwide. We have entered an open and digital learning era, significantly impacting individuals and the education sector. Education is constantly changing and evolving. The Digital Education System has improved interaction methods between participants in the teaching-learning process. MOOCs are among the best open and digital learning platforms, as they broaden educational opportunities. The term 'MOOCs' denotes open access to globally available, accessible, video-based instruction, problem sets, and online forums to many participants who wish to take a course or learn. The present study offers an overview of massive open online courses (MOOCs), their benefits for distant learners, and details of various MOOC platforms such as The Open University, ALISON, Open Learning, Coursera, Udacity, EdX, and SWAYAM, all available free of charge to distance learners worldwide. This paper also explores the availability of MOOCs in India and highlights various institutions and companies in the country that provide MOOC courses. Furthermore, it concludes that MOOCs have vast potential to facilitate and ensure sustainable growth.

Keywords: MOOCs, Open and Digital Learning, Massive Open Online Courses.

INTRODUCTION

The evolution of information and communication technologies has seen new ways of teaching and learning. Education and technology are the two sides of the same coin. We can only imagine education with the use of technology these days. Imparting education via technology is considered a promising development in the education system. Technological usage in education provides an

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online global environment for learning. Digital Education Systems refer to systems and platforms that utilise digital technologies to deliver educational content, facilitate learning interactions, and support various aspects of the educational process. Significant changes in the use of technology in online education have led to the emergence of Massive Open Online Courses (MOOC). MOOC is a popular way to deliver online education globally. It is the most prominent trend in higher education these days. These platforms are designed to connect people from different areas to participate, enrol themselves and benefit from education. It provides assignments and feedback options as an interactive forum between learners and facilitators. This platform has a lot of attractive features which attract almost every group of society, of which some are economically weaker section, people who have started earning at a very early age for their livelihood, women, in-service teachers, other teaching professionals and especially those who cannot move out of their homes for one reason or the other. It seems like a blessing to them. This digital era has made education free from all boundaries like physical, geographical, religious, financial, etc. It provides free, easily accessible, completely online courses that offer opportunities to study at top universities worldwide. It allows anyone, anywhere, to participate via video lectures, computer-graded tests, and discussion forums (Matthew, 2014). It is open to everyone without entry qualifications and offers a full/complete course experience online for free (Brouns et al., 2014). This platform comes to reach education in every corner of the world. Those who want to learn can benefit by using these online platforms. The term MOOCs was initially coined by the Canadian academician Dave Cormier of the University of Prince Edward Island in 2008 for a large online class taught by George Siemens of Athabasca University and Stephen Downes of Manitoba University, Canada. It is known by different variants in cyberspace - online courses, open courseware, video lectures, online education, online studies, and open educational resources (Umesh, 2017). A MOOC is a revolutionary idea that transformed how distance learning works. The increase in MOOCs' popularity has resulted in many MOOC platforms' availability.

ELEMENTS OF MOOCS

1. **Massive:** It means large. An online course designed for many participants (unlimited number of participants). The course is designed such that the effort required to provide all services does not increase significantly as the number of participants increases.
2. **Open:** Course can be accessed by anyone anywhere as long as they have an internet connection. Open as in freedom of place, pace and time. The course can be completed for free and is open to everyone without entry qualifications.
3. **Online:** The entire course is available through the internet, i.e. it's online.
4. **Course:** The course offers a full course experience, including educational content, facilitation of peer interaction (including some but limited interaction with academic staff), activities/tasks, quizzes, and tests, feedback, some kind of (non-formal) recognition options, a study guide/syllabus, an examination, and a certificate of completion.

TYPES OF MOOCS

MOOCs can be broadly categorised into c-MOOCs and X-MOOCs.

i) **c-MOOCs**: The first type is c-MOOCs. The first MOOC was “Connectivism and Connective Knowledge (CCK08)” in 2008 by George Siemens and Stephen Downes at the University of Manitoba, with 2200 participants from around the world (Altinpulluk & Kesim 2016). It is based on the connectivist theory of education, which states that connectivism, openness, and participatory teaching are the principles. Participants share their views, resources, etc., on a particular topic and send it to the instructor. The latter sorts the material, organises it into a shareable e-mail with embedded HTML links, and sends it to all the participants. They share information and engage in joint experiences. This builds a “connective ecosystem” of learning resources under a common platform.

(ii) **x-MOOCs**: They have a background in the evolution of open courseware and educational resources. X-MOOCs are generally offered by universities in collaboration with a commercial organisation/company whose aim is to gain profit. They are online versions of traditional learning formats, for example, video lectures followed by short quizzes and tests, instruction, discussion and interactions are mostly done through peer review and others (Haron et al. 2019). MOOCs provide an opportunity for a course offered for free or at a lower cost widely and globally. The courses in MOOCs conducted at Higher Learning institutions were in the category of X-MOOCs (Haron et al. 2019). Thus, the freeness of courses is a significant feature that interprets the widespread use of MOOCs. The low cost is not just for participants or learners but for educators; it's a free tool to establish MOOCs are available. This makes MOOCs more convenient for learners to pick what knowledge or skill suits them without committing to a particular context, time, and resources (Abu-Shanab & Musleh 2018).

VARIOUS MOOC PLATFORMS AROUND THE WORLD

Alison

Alison is an Irish online education platform. It is one of the world's largest free learning platforms for education and skills training. It provides certificate courses and accredited diploma courses. It was founded on 21 April 2007 in Galway, Ireland, by Irish social entrepreneur Mike Feerick. It is a for-profit social enterprise dedicated to making it possible for anyone to study anything, anywhere, at any time, for free online, at any subject level. The mission of ALISON is to enable people anywhere in the world to learn and get certified in new skills among hundreds of free courses to adopt from business and enterprise, languages, personal development and IT using their free, interactive multimedia.

Coursera

Two Stanford professors, Andrew Ng and Daphne Koller, officially launched Coursera in January 2012. It is the biggest provider of MOOCs (massive open online courses), with 100+ million learners worldwide and more than 150 partner universities. It collaborates with top universities and organisations worldwide to offer free courses online for anyone. Currently, Coursera offers

over 10,000 courses from over 300 partners. Beyond single courses, Coursera offers its credential, known as a Specialization. Coursera's catalogue presently lists more than 840 Specializations. The MOOC platform also hosts 26 fully online master's degrees in computer science, data science, business, and public health. Coursera for Business makes online courses available to business clients.

EdX

EdX is an online initiative taken by Harvard and MIT in May 2012 which seeks to provide the highest quality education, both online and in the classroom, for students and institutions through cutting-edge technologies, innovative instructions, and demanding courses. Today, EdX connects over 86 million people worldwide with online learning, delivering real professional progress across nearly every career discipline, from artificial intelligence and robotics to sustainability and public health. Together with universities and organisations at the forefront of their fields, EdX offers thousands of job-relevant programs designed to give every ambitious learner a path to achievement

Iversity

It is a European online learning platform that enables universities to share a broad range of courses with students from around the globe and provide opportunities to earn recognised credentials. It started working in 2011 and furnished a new direction to the existing teaching methods and formats by providing online interactive teaching and distance learning. It works in close association with universities, individual course instructors and knowledge-based companies to build high-quality open courses covering a range of subjects, including computer science, design, economics, law, medicine, physics, and philosophy. Iversity makes higher education more accessible, more affordable and more personalised.

Open Learning

Open Learning is a MOOC platform founded in 2012 in Australia that allows anyone to design, run, and join a course. The University of New South Wales hosts it and has a mission to give learners the freedom and flexibility to create a community, communicate their creativity, and explore themselves through education. The platform supplies courses in marketing, programming, writing skills, etc.

The Open University

It is the UK's most extensive distance learning and research University founded by Royal Charter. It provides high-quality distance learning to people of every age and different backgrounds, whether school students, school leavers, people who desire to develop or update their expertise, or retired people who need to explore new interests and wish to acquire higher education regardless of their locality and place. Does not require any prerequisites for a formal university founded by the Royal Charter. It provides high-quality distance learning to people of every age and different backgrounds, whether school students, school leavers, people leavers, people who desire to develop or update their expertise, and retired people who need to explore new interests

and wish to acquire higher education regardless of their locality and place. It doesn't require any prerequisites for formal entry to start a course.

Udacity

Udacity is a for-profit educational organisation founded by Sebastian Thrun, David Stavens, and Mike Sokolsky, who contribute to MOOCs. It was started in 2013 in the USA. Udacity is the offshoot of free computer science classes offered in 2011 through Stanford University. It provides more than 200 courses. Its mission is to bring accessible, affordable, engaging, and high-quality higher education to the world and seek to empower students to advance their education and careers. Udacity is reinventing education for the 21st century by bridging the gap between real-world skills, relevant education, and employment.

MéxicoX

MéxicoX is a MOOC platform funded by the Mexican government, and it has more than 40 partners (universities and institutions from the Federal Public Administration). It has more than 2.6 million registered learners, a majority of whom are located in Mexico.

FutureLearn

FutureLearn is a UK-based MOOC platform with 19 million users. The Open University launched FutureLearn at the end of 2012. Later, it was jointly owned by the Open University and the Australia-based SEEK Group. Most of its university partners are in the UK and Europe, but it also has a few partners in other countries, including the United States, Australia, and South Korea.

Miríada X

Miríada X is a regional MOOC platform that has more than 600 courses in Spanish and Portuguese. These courses are created by its university partners, located in Spain, Argentina, Peru, Colombia, Mexico, Brazil, Chile, and other Spanish and Portuguese-speaking countries.

EduOpen

EduOpen is a MOOC platform funded by the Italian government. It was launched in April 2016. EduOpen is a network of Italian universities, but it is also open to EU universities. At the moment, it involves nineteen institutes, including a mixture of larger and smaller institutions from northern and southern Italy.

MOOC.fi

MOOC.fi is a MOOC platform from the University of Helsinki's Department of Computer Science. The MOOC platform offers around 20 open, free and beginner-friendly courses in computer science, such as Elements of AI, Python Programming and Ethics of AI. Around eight courses provide free certificates.

JMOOC

JMOOC is not a MOOC platform. It is a non-profit association that promotes MOOC education in Japan. JMOOC has its own certification standards process that assesses the quality of MOOCs in Japan. Courses that pass this examination are qualified as JMOOC-certified courses. The three Japanese MOOC platforms listed above all offer JMOOC-certified courses. JMOOC currently offers over 600 courses.

K-MOOC

K-MOOC, or Korean MOOC, is Korea's official MOOC platform. The Ministry of Education initiated the platform, which went live in 2015. Currently, it lists over 4000 courses, and over 3 million learners have registered on it.

ThaiMOOC

ThaiMOOC is one of the newest MOOC platforms on this list. It was launched in March 2017 and is the official MOOC platform for Thailand. The platform is built on Open edX and lists more than 700 courses.

MOOC PLATFORMS IN INDIA

SWAYAM

The Indian government has launched an Indian-focused MOOC platform, SWAYAM (Study Webs of Active Learning for Young Aspiring Minds). SWAYAM is India's national MOOC platform. It offers over 2600 courses taught by over 1,300 instructors from 200 Indian universities. It is the world's largest online free e-learning platform portal initiated by the government and designed to achieve the three cardinal principles of education policy: access, equity and quality. To ensure the best quality content, Nine National Coordinators have been appointed. They are:

- AICTE (All India Council for Technical Education) for self-paced and international courses
- NPTEL (National Programme on Technology Enhanced Learning) for Engineering
- UGC (University Grants Commission) for non-technical post-graduation education
- CEC (Consortium for Educational Communication) for undergraduate education
- NCERT (National Council of Educational Research and Training) for school education
- NIOS (National Institute of Open Schooling) for school education
- IGNOU (Indira Gandhi National Open University) for out-of-school students
- IIMB (Indian Institute of Management, Bangalore) for management studies
- NITTTR (National Institute of Technical Teachers Training and Research) for Teacher Training Programme

NPTEL

The National Programme on Technology Enhanced Learning (NPTEL) is a collaborative project of some of India's best higher education institutions to deliver university-level online engineering and science courses. NPTEL's catalogue has now been integrated into SWAYAM, India's national MOOC platform. NPTEL also has a YouTube channel where students can watch video lessons in their courses.

mooKIT

mooKIT is a MOOC Management software designed and developed at IIT Kanpur. mooKIT is a system that instructors, learners, and system administrators find easy to work with - designed for "Internet Novices." Its unique architecture makes it highly customisable and cost-effective at any scale. It is a lightweight MOOC Management System targeting developing nations. It has been used in more than 60 courses in India and abroad.

BENEFITS OF MOOCS

- **Global access and scalability:** It ensures learners access high-quality education worldwide. Because it is online, it can be accessed anytime and from anywhere. Learners do not need to travel to the institute to attend classes.
- **Flexibility and convenience:** MOOCs are flexible and self-paced, allowing learners to customise their learning experiences. They also give learners the autonomy to decide how and when they want to learn. MOOCs contain documents for self-learning, videos, links, discussions, quizzes, and debates that learners can access anytime. Learners can also watch and re-watch lecture videos free of cost.
- **Cost-effectiveness and affordability:** Learners can choose where, when, how, with whom, and even what to learn. They have the maximum power to choose what they want to learn, and that too free of cost.
- **Opportunities for skills development:** It opens up more opportunities for career advancement and lifelong learning. In this digital era, people are constantly connected and interact with each other. These connections and interactivity lead to knowledge building.
- **Diversity:** MOOCs provide variety for learners from all corners of the world, helping them develop diverse thinking. They also collaborate and share knowledge within online learning communities, enhancing the quality of discussions and the learning environment.
- **Lifelong learning:** By participating in a MOOC, learners can improve their skills throughout their lives. There is no age limit for joining MOOCs. They enable learners to think about their own learning and knowledge absorption.

CHALLENGES OF MOOCS

- **Low completion rates:** One of the biggest challenges is that students would prefer to be interested in completing the course. This is because they aren't inclined to do so. After all, they have not paid any fees. The attrition rate in such classes was high; only 15% of the enrolled students completed the course.

- **Not meant for students with disabilities:** Learners who have visual disabilities can't be made to go through such courses.
- **Needs good internet connection and Digital literacy:** A good internet connection and digital literacy are necessary to use online materials, as a digitally literate person is able to use technology effectively to find and evaluate information.
- **Lack of Student-Teacher Interaction:** Although student-teacher interaction has existed for ages, MOOCs severely need to improve it. Due to this lack of interaction, MOOCs need more depth of education.
- **Students Need to Be Self-Disciplined:** MOOCs require students to be very self-disciplined. The onus of learning relies entirely on the students and their dedication, without the guidance of teachers or peers.

FUTURE OF MOOCS

The future of Massive Open Online Courses (MOOCs) holds great promise as they significantly impact expanding access to education. It has revolutionised education in various ways. With the rise of virtual reality (VR) and augmented reality (AR) technologies, MOOCs are likely to become even more interactive, personalised, and immersive. Artificial intelligence and machine learning algorithms will be crucial in customising educational content for individual learners, providing personalised learning paths and real-time feedback. They have made education easily accessible to anyone anywhere, anytime around the globe and made people's lives better by providing flexible and quality learning as it was earlier. They have made a difference by providing free courses and enabling people and students from around to participate, interact, discuss and learn from the renowned faculty of this world, thereby improving people's lives and bringing out real change to communities as a whole.

CONCLUSION

MOOCs play a vital role in higher education by providing accessible, flexible, and affordable courses for free or low-cost learners interested in learning. It is a revolutionary idea that has transformed the way distance learning works. MOOCs opened up the time and geographic barriers imposed on the learners and allowed them to take courses from some of the world's brilliant minds without travelling and paying a fortune to attend a prestigious institution. MOOCs are gaining popularity daily, owing to their quality and tag of some of the biggest names in the academic space. Its advanced features attract not only learners but every group of society. Just imagine someone from a remote village being able to watch a lecture by a professor of the illustrious MIT. Here lies the beauty of MOOCs, which make this possible. It opens the "Repository of knowledge" for everyone. It makes knowledge available for everyone interested in learning. It frees knowledge from the barriers of space and time. While most MOOCs are free for anyone to view, some offer a certificate of completion, charging a nominal fee. These can vary from short-duration micro programs to long-duration degree programs. It brings new opportunities for innovation in higher education, allowing institutions and academics to explore new online learning models and innovative practices in teaching and learning. MOOCs are not only an effective tool to offer quality education in a diversified and open way but are also

significant developments to aid higher education. In addition to students, corporate houses are also showing interest in MOOCs for their employees by adopting MOOCs in their service portfolio.

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CHAPTER FIVE

SKILL DEVELOPMENT THROUGH OPEN EDUCATIONAL RESOURCES: AN OVERVIEW

Jyoti Sharma

ABSTRACT

In today's rapidly evolving world, acquiring and enhancing skills have become pivotal to personal and professional success. The rise of technology and the internet has transformed access to educational materials. Open Educational Resources (OER) have emerged as a dynamic and democratising influence, reshaping how people can enhance their skills. This overview delves into Skill Development through Open Educational Resources, shedding light on these resources' profound impact on education and workforce readiness. This paper examines the importance of continuously improving skills in today's rapidly evolving job market and the future prospects of open educational resources for skill development, considering the historical development of OER initiatives in India and skill development. It also emphasises the shifting demands of the modern workforce with the advantages of using OER for skill development, including affordability, accessibility, and flexibility. Additionally, it provides detailed case studies and examples that demonstrate the positive impact of OER on skill development in various settings, with a specific focus on the potential of adaptive learning technologies within OER. This paper also focuses on the challenges in sustaining OER and strategies to overcome these challenges.

Keywords: Skill Development, Open Educational Resources, Technology, Challenges, Strategies.

INTRODUCTION

Workforce development is one of the critical issues for a country's economic growth, especially in developing countries. The era is marked by a paradoxical situation wherein the students blooming out of academia find themselves ultimately unfit for the industry. The workforce is under constant stress in the dynamic, disruptive VUCA world of work. The need of the hour is skill development to bridge the skill gap and prepare for the future. The researchers have made a literature review of skill development in India and identified that skill gaps are a pressing and

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critical issue. The need to resolve the skill gaps is evident across industries and is more relevant than ever. The demographic advantage of India can be capitalised only when the workforce is trained and prepared with contemporary and future skill sets. It is essential to focus on advancing skills relevant to emerging economic development so that India can transform into a Knowledge Economy and meet the global skill demands (Behera & Gaur, 2022).

To achieve this goal, it becomes necessary to update the existing knowledge and skills of the workers through continuous training programmes. This task seems intricate because most of the workforce is unorganised. It consists of people in different places, and it is difficult for the government to control such a scattered workforce. Moreover, most of them are low-paid and need more secure jobs. For instance, 464 million an estimated workforce of 464 million is in the unorganised sector in India. It isn't easy to enhance their existing skills and competencies per the industry's needs through the formal system. Providing high-cost equipment and lab facilities to such a vast workforce is another obstacle to their development (Gaba & Prakash, 2017). To enhance skill development, it is recognised that open educational resources should be accessible to all.

SKILL DEVELOPMENT

Skill is generally constructed as one's ability, competence, proficiency and talent to successfully execute a given job or task. One may either possess it naturally or develop it gradually over time. Soft skills may signify one's traits and attributes, like people, communication, leadership, etc. or hard skills honed with education/training and experience. An employer wants hard and fit skills in his workforce so that the required work can be done effectively and efficiently in his organisation. Hence, the employer tests these skills during recruitment to find suitable candidates and later tries to enhance their skills through training and development. The need of the hour is skill development to bridge the skill gap and prepare the prospective workforce to be industry fit (Behera & Gaur, 2022).

Skill development refers to the process of acquiring and enhancing specific abilities, knowledge, and expertise in a particular area. It is crucial for personal growth, career advancement, and adapting to changing demands in various industries.

Skill development education (SDE) is a leading necessity of modern society. It can transform human beings into human resources, so we need to develop marketing strategies to promote it. Along with higher education, SDE is equally important for the future generation. By conferring knowledge and skill training on the young generation, SDE accelerates the developmental process.

While developing marketing strategies, many regions must be considered for skill development education. Young adults, going from 18 to 30 years of age, require more motivation than retired adults past 65 years of age. Different marketing efforts are necessary for the audience of varying age groups. Differing advertising strategies may get more effective results. Individuals aged 18-25 spend time playing games, watching Television, and getting involved in other electronic

gadgets. TV and motivational ads are practical strategies to chat at this age. Skill Development Institutions centre around this age group. They can use suitable advertising mediums, like regional magazines and local newspapers, TV advertisements, and social connection efforts to try to interface with their audience. Local and regional magazines with sub-sections related to educational skill programs and oriented technical courses with placements strongly affect the young age demographics. Television motivational and awareness advertisements are an excellent technique to contact the target student group by setting commercials on debates, talk shows, and reality shows. Effective advertisement can be done by caring for other adults in the community. Skill Development Institutions can arrange a workshop for secondary school students entering the workforce. Establishments can offer free shows to students about to complete schooling. Bookshops and libraries can organise reading and writing programs (Loomba, 2022).

OPEN EDUCATIONAL RESOURCES (OERs)

Open Educational Resources (OERs) are defined as ‘teaching, learning and research materials in any medium that may be composed of copyrightable materials released under an open license, materials not protected by copyright, materials for which copyright protection has expired, or a combination of the previous’ (UNESCO, forthcoming), have the potential to contribute to reaching this objective by increasing access to learning as well as improving the quality of the learning experience (Ehlers, 2011).

The OERs movement is based on the idea that educational resources (e.g., content or course designs) should be released under licenses that allow anyone to freely access, retain (e.g., download, duplicate, store), reuse, revise (e.g., translate, adapt, modify), combine and-or re-share them (Tlili, Huang, Chang, Nascimbeni & Burgos, 2020).

OERs are a transformative force in education. They offer a solution to the rising costs of traditional textbooks and educational materials, allowing students to access high-quality resources without financial constraints. Types of OERs also empower educators to customise and adapt content to suit their teaching objectives and students’ needs, fostering a more dynamic and engaging learning experience and referring to freely accessible and openly licensed educational materials designed for educational purposes, primarily in digital formats. These materials are provided to the public at no cost, and they often carry licenses that allow users to modify, share, and redistribute them, thereby promoting inclusivity and fostering a culture of collaboration in education.

OERs encompass many resources, including textbooks, lesson plans, multimedia content, and assessment tools. They are crucial in reducing students’ financial burdens, increasing access to quality educational materials, and supporting innovative teaching and learning practices.

Beyond cost savings, OERs promote inclusivity by catering to diverse learning styles and abilities, making education more accessible to underserved and marginalised communities worldwide. Moreover, they encourage collaboration and the sharing of knowledge, fuelling innovation and the evolution of teaching and learning practices. In an era of digital learning and

open access, OERs are revolutionising education by bridging the knowledge gap and making quality education a universal right rather than a privilege (Sujata, 2023).

OERs are typically created by educators, institutions, or organisations who believe in open access to knowledge and learning. They aim to provide equal opportunities for education by removing barriers such as high costs associated with traditional educational resources. OERs can be found in various formats and platforms, including dedicated OER repositories, academic websites, and online learning platforms. They cover different subjects and disciplines, catering to learners of all ages and backgrounds.

Overall, OERs represent a transformative approach to education. They seek to make quality learning resources available to everyone, fostering a more inclusive and equitable educational landscape.

Today, skill development encompasses many areas, including technical skills, soft skills, digital literacy, entrepreneurship, and lifelong learning. Governments, organisations, and educational institutions invest in programs and initiatives to promote skill development and bridge the gap between education and employment.

RELEVANCE OF SKILL DEVELOPMENT IN TODAY'S JOB MARKET

Skill development is highly relevant and vital in today's rapidly changing job market due to several reasons:

- **Technological Advancements:** Rapid technological advancements are reshaping industries and job roles. Automation, artificial intelligence, and digitalisation are replacing traditional tasks, creating a demand for new skills. Continuous skill development ensures individuals can adapt to technological changes and remain employable.
- **Job Market Competition:** The job market has become highly competitive, with a larger pool of qualified candidates vying for limited opportunities. Developing new skills or enhancing existing ones gives individuals a competitive edge, making them more attractive to employers.
- **Evolving Job Roles:** Many job roles are evolving and require a broader range of skills. Employers seek candidates who possess a combination of technical, soft, and transferable skills. Skill development enables individuals to meet the changing demands of job roles and contribute effectively in dynamic work environments.
- **Lifelong Learning:** Learning is a lifelong process in today's knowledge-based economy. Continuous skill development allows individuals to stay relevant and up-to-date with industry trends, ensuring their knowledge and abilities remain current throughout their careers.
- **Career Growth and Advancement:** Skill development is crucial for career growth and advancement. Acquiring new skills or improving existing ones opens up opportunities for promotions, salary increases, and career transitions. It demonstrates a commitment to professional development and enhances employability.

- **Adaptability and Resilience:** Rapid changes in the job market, such as economic fluctuations or industry disruptions, require individuals to be adaptable and resilient. Developing a diverse skill set equips individuals with the ability to navigate uncertainties and seize new opportunities.

GROWTH OF OPEN EDUCATIONAL RESOURCES INITIATIVES IN SKILL DEVELOPMENT

Over the years, OER initiatives have made significant strides in education. These initiatives began in the early 2000s when sharing educational materials online gained traction. They are rooted in the Massachusetts Institute of Technology (MIT). In 2002, MIT launched the Open Courseware (OCW) project to make MIT course materials freely available to anyone with internet access. This groundbreaking move set the stage for the growth of OER initiatives worldwide.

In 2005, UNESCO defined "Open Educational Resources" as "teaching, learning, and research materials in any medium that resides in the public domain or has been released under an open license." This definition provided a framework for the development and dissemination of OERs.

In 2012, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) released the Paris OERs Declaration, which called upon governments to support the use and development of OERs. This declaration further fuelled the growth of OER initiatives globally as countries began to recognise their potential to improve access to quality education.

Education systems worldwide are facing pressure to increase access to education and training while ensuring it is affordable and meets high-quality standards. While governments have signed on to international agreements supporting education as a fundamental human right and a sustainable development goal (SDG), many are finding that cost and quality factors must be revised to meet their obligations. To this end, COL's Kuala Lumpur Declaration (Commonwealth of Learning, 2016) recommends mainstreaming OER use by developing strategies and policies at governmental and institutional levels to enhance quality while potentially reducing the cost of education.

Access to relevant learning resources is an important aspect of lifelong learning, but providing that access at the necessary scale is proving challenging. Addressing this challenge is essential to ensuring inclusive and equitable quality education and lifelong learning opportunities for all, as outlined in SDG4, and to supporting citizens in gaining sustainable livelihoods.

COL has identified the development of OER as a potential answer to these challenges. OER provides governments, institutions, organisations, and individuals with the best global materials. It allows them to adapt the materials to fit the local context and reduces the costs associated with materials and course development.

The OERs for Skills Development is a three-year project funded by The William and Flora Hewlett Foundation, USA. Throughout the project (July 2015 – June 2018), COL has worked with approximately 80 institutions at different levels of the educational spectrum to support

capacity building in OERs, the integration of information and communication technology (ICT) in teaching and learning, policy development for OERs and the development of relevant courses by repurposing OERs to be made available as OERs. Further, COL has supported several institutions in mainstreaming OERs at a systemic level.

In its three years of operation, the project has supported the development of 29 provincial OER policies and guidelines in three countries, developed 53 institutional OER policies in the higher education and TVET sectors, trained approximately 300 teachers in over 100 institutions on the use of OERs in teaching and learning, sensitised over 650 policymakers on the benefits of OER for education, and developed 26 courses and toolkits contributing to the propagation of OER.

COL's long-term vision is for institutions and organisations across the Commonwealth to develop and use OER-based courses and materials to provide access to quality education and training and support the development of sustainable livelihoods for all Commonwealth citizens.

OPEN EDUCATIONAL RESOURCES INITIATIVE IN INDIA

- | | |
|--------------------------------------|---------------------------------|
| 1. Alternative Academic Calendar | 9. Swayam Prabha (DTH Channels) |
| 2. Diksha (Mobile App). | 10. Swayam (Online Courses) |
| 3. Learn Engg. (Engineering Courses) | 11. National Digital Library |
| 4. Epathshala (Mobile App) | 12. NREOR (Resources) |
| 5. Vlabs (Virtual Labs) | 13. NISHTHA (Mobile App) |
| 6. CEC-UGC YouTube channel | 14. E-PG Pathshala |
| 7. NPTEL | 15. Vidwan (Research) |
| 8. E-Shodhsindhu | 16. NCERT |

CASE STUDIES ILLUSTRATING THE IMPACT OF OER ON SKILL DEVELOPMENT

Open Educational Resources (OERs) have positively impacted skill development in various contexts. Here are some examples of case studies that illustrate this:

1. The Massachusetts Institute of Technology (MIT) Open Course Ware MIT Open Course Ware is a well-known example of OER. A study by Hilton, Gaudet, Clark, et al. (2013) examined the impact of MIT's Open Course Ware on educators' professional development. The study found that the availability of OER from MIT led to enhanced teaching skills and professional development among educators who used the resources.

2. TESS-India (Teacher Education through School-based Support in India) TESS-India is a large-scale OER initiative to improve teacher education quality in India. A study by Wolfenden,

Adinolfi, et al. (2017) evaluated the impact of TESS-India OER on teacher professional development and found that using OER positively influenced teachers' pedagogical skills and knowledge.

3. Islim and Cagiltay (2016) conducted a case study on the impact of OER on the Instructional Effectiveness of Middle East Technical University, Turkey students, which aims to investigate the instructional effectiveness of Open Educational Resources (OER). It was conducted with 1196 university students enrolled in a general chemistry course with an experimental laboratory section. These students voluntarily used OER for their lab activities. Data were collected via a printed, 18-question survey. Results showed that about half of the students were aware of the OER, and half of these informed students used it. Nonetheless, four advantages of the OER were determined: preparation for the topic in advance, facilitating learning, time-saving, and improving grades.

Overall, these case studies demonstrate the power of OERs to impact skill development in a range of contexts positively. By providing free access to high-quality educational materials, OERs can help to level the playing field and provide opportunities for people who may otherwise have been excluded from education.

ADVANTAGES OF USING OERS FOR SKILL DEVELOPMENT

Open Educational Resources (OER) offers several advantages for skill development, including affordability, accessibility, and flexibility.

- **Affordability:** OER is free to access and use, making it an affordable option for learners. This eliminates the financial barriers associated with traditional educational resources, such as textbooks and course materials. OER enables individuals to acquire new skills and knowledge without incurring significant costs.
- **Accessibility:** OER is accessible to anyone with an internet connection, regardless of geographical location or financial status. Thus, it makes learning resources available to individuals who need access to traditional educational resources. OER promotes equal opportunities for education and skill development.
- **Flexibility:** OER can be customised to meet individual learning needs. Learners can adapt and modify OER to suit their unique requirements, enhancing their skill development in a way that suits their learning style. This flexibility allows learners to tailor their educational experience and achieve their learning goals.
- **Collaboration:** OER promotes collaboration and knowledge sharing among learners and educators. By freely sharing resources, OER fosters a collaborative learning environment where individuals can engage with others, exchange ideas, and collectively enhance their skills. This collaboration enhances the learning experience and promotes a sense of community among learners.
- **Continuous Improvement:** OERs can continuously update and improve based on user feedback. This ensures that the learning materials remain up-to-date and relevant to the

changing demands of the job market. Continuous improvement ensures learners access the latest information and resources, enhancing their skill development.

CHALLENGES IN QUALITY CONTROL AND SUSTAINABILITY

- **Ensuring Accuracy and Reliability:** One key challenge in OER initiatives is ensuring the accuracy and reliability of the content. Since a wide range of contributors creates OER materials, it becomes essential to establish quality control mechanisms to verify the accuracy of the information provided and address any errors or outdated content.
- **Maintaining Consistency:** Creating OER materials can be challenging, as multiple contributors are involved. This can make maintaining consistency in style, format, and content difficult.
- **Addressing Language and Cultural Barriers:** OER initiatives often aim to reach a global audience, which means content needs to be accessible to learners from diverse linguistic and cultural backgrounds. Translating and adapting content to different languages and cultural contexts can be challenging.
- **Funding and Resource Allocation:** Sustainability is crucial for OER initiatives, which often rely on external funding and resources. Securing long-term financing and establishing sustainable business models are essential for developing and maintaining OER materials.
- **Technical infrastructure:** OER initiatives require robust technical infrastructure to host, distribute, and update the learning materials. This includes reliable servers, bandwidth, and maintenance support.
- **Community engagement and collaboration:** Building a strong community of contributors, users, and advocates is also a major challenge for the sustainability of OER initiatives.

STRATEGIES FOR EFFECTIVE USE OF OERS FOR SKILL DEVELOPMENT

- **Establish Quality Assurance Processes:** Implementing robust quality assurance processes, including peer review, expert validation, and regular updates, can help ensure the accuracy and reliability of OER materials.
- **Provide Training and Support:** Offering training programs and support resources for contributors can help maintain consistency in content creation and address any technical or pedagogical challenges they may face.
- **Foster Collaboration:** Encouraging collaboration among educators, institutions, and organisations can lead to the sharing of best practices, resources, and expertise. Leveraging collective knowledge and resources can help address sustainability challenges.
- **Seek Diverse Funding Sources:** Diversifying funding sources by exploring partnerships with educational institutions, governments, NGOs, and corporate sponsors can help ensure the long-term sustainability of OER initiatives.
- **Promote Open Licensing:** Adopting open licensing frameworks such as Creative Commons licenses can facilitate the reuse, adaptation, and redistribution of OER materials while ensuring proper attribution to the original creators.

- **Encouraging Collaboration:** Engaging educators, students, and other stakeholders in developing and improving OER materials can foster a sense of ownership and commitment. Encouraging collaboration through online forums, workshops, and conferences can further strengthen the community.

CONCLUSION

Open educational resources have had a significant impact on skill development. By providing free and accessible learning materials, OER has democratised education and allowed individuals from all backgrounds to acquire new skills and knowledge. OER has also allowed for more personalised and self. Overall, the impact of OER on skill development has been transformative, empowering individuals to acquire new skills, advance their careers, and contribute to the global knowledge economy.

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CHAPTER SIX

DIGITAL LEARNING IN THE INDIA POST PANDEMIC SCENARIO

Monika Tayade and Vijay Chavan

ABSTRACT

Many learners are affected due to the pandemic and subsequent lockdown. There was no provisional plan for such a pandemic, so lockdown was the only option, and all nations adopted it due to the severity of the pandemic. It resulted in compulsive homeschooling. Many tests and exams were cancelled or postponed due to the lockdown. We have also seen inequality in the availability of resources for online education. Colleges, institutions, and schools adopted an online mode for procedures that can be completed online. Illiterate parents were unable to help their children with online education. Both the parents who were working from home could not give attention to the learning of their wards. There was a rise in e-learning activity due to the lockdown and this increased demand for internet connectivity. Online content was available in various education-related fields. There was an increase in the number of Ed-tech Companies. Certification was available from different national and international organisations. We have seen the growth of many Edtech platforms that were a means of earning for many, but as the lockdown subsided, we have noticed the changing scenario of offline education. We have witnessed an emphasis on STEM. Social-emotional learning has hampered individual students, teachers, and parents. The present paper highlights the situation in the education system during and after the pandemic. The paper will throw light on the strategy adopted for digital education post-lockdown.

Keywords: Digital, Education, Learners, Offline, Online

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INTRODUCTION

Education is a crucial aspect of the development of any country. Education and learning can transform human beings and bring progress to society. Education is about gaining certificates or degrees and acquiring knowledge, skills, and attitudes that individuals can apply in their daily lives. Ways of imparting education have undergone tremendous changes. Technology intervention is one of the keys to the changes we are witnessing. Initially, information technology (IT) resources available in education were invested in teaching computer science at the university level and later at the school level (Rushby, N. 1983). India has seen tremendous changes in the education system since independence. Education is crucial to development, so the nation must have a robust education system. The Ministry of Education (MoE) was created on September 26th, 1985. MoE works through the Department of School Education & Literacy and Higher Education. Education plays a significant role in uplifting society; people learn, grow, and share their knowledge, and thus, there is a continuous flow of knowledge. Education and employment are crucial for every individual—education and skill development help generate employment, which helps improve the country's economy. The government needs a sound education system that caters to the needs of all individuals, even if they are from the remotest region in the country. Thus, providing education to all, including the disadvantaged groups or the remotest part of the country, is an essential agenda for the entire nation. Education plays a vital role in shaping the future. Education from K to 12 is of utmost importance for each individual in society as it caters to the basic educational needs of the individual. The education sector from K to 12 is divided into segments: Pre-primary, Primary, Higher, and Secondary School.

As per the demand of today's fast-paced world, teachers must be equipped with digital teaching tools. Education helps us to understand our current needs; it laces us with prospects. Technology has found various ways to help individuals learn at their own pace. While education is a way to transform the education system by integrating technology, we cannot deny the interrelationships between technology adoption and education; they go hand in hand. (National Education Policy, 2020). Before the pandemic, India had begun the Digital India campaign for the digital economy, and people were coping with it. Still, with the lockdown situation, digitisation became a compulsory option for the people (Ministry of Education, India). The use of technology was already begun in education with the introduction of the 'Smart Classroom'. The Digital India Campaign is helping to transform the entire nation into a digitally empowered society and knowledge economy. (National Education Policy, 2020). Technology will impact education in many ways, using various tools such as computers, smartphones, tablets, smart boards, etc. Technological interventions will improve the teaching-learning process and evaluation systems, equip teachers with gadgets and online material, and motivate teachers for professional development.

BACKGROUND

One of the main purposes in the 1960s and 1970s for using IT in education in many countries was to enhance existing teaching and learning practices or curricula (Cox, M. J. (2010). Education is a vast arena. With India's large population, reaching every nook and corner of society is difficult. The government tries to educate every section of society through various programs and schemes.

There has to be a provision for bringing everyone to the educational platform. It is the right of every individual to get an education. Education should be imparted to everyone without discrimination of gender, caste, age, physical deformity, geographical location, etc. Education should reach the masses for the development of the country. There are many programs and schemes run by the government of India and even by some private organisations that work to improve the education system and target to improve the gross enrolment ratio. Technology has become an integral part of the education system. We are aware of the use of technology for day-to-day teaching-learning processes. TV, computers, mobiles, speakers, microphones, LCD projectors, smart boards, etc., are the technological tools used in classroom transactions. There was a rise in e-learning activity due to the lockdown; this resulted in a rise in demand for internet connectivity. Online content was available in various education-related fields. There was an increase in the number of EdTech Companies. Certification was available from various organisations at national and international levels.

We have seen the growth of many EdTech platforms that were a means of earning for many, but as the lockdown subsided, we noticed the changing scenario of offline education. We have witnessed an emphasis on STEM. The teaching-learning process aims to improve learning outcomes among learners; with the help of technology, we can avail ourselves of digital education, which is a need in today's fast-paced world where learners are constantly seeking knowledge. National Mission on Education through ICT (NMEICT) is an initiative of the Ministry of Human Resource Development (MHRD) to infuse digital education solutions to improve access to quality content and learning outcomes. Major ongoing initiatives under NMEICT are SWAYAM, SWAYAM Prabha, National Digital Library (NDL), e-Yantra, FOSSE, Spoken Tutorials, and Virtual Labs. Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM) is a program initiated by the Government of India and designed to achieve the three cardinal principles of Education Policy, viz., access, equity, and quality. This effort aims to take the best teaching and learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy. (Digital initiatives in Higher Education. (2009). SWAYAM PRABHA provides 32 high-quality educational channels through DTH (Direct to Home) across the country on a 24/7 basis; this will help deliver digital education at low cost and across all geographical locations. The National Digital Library of India (NDL) project has been entrusted to IIT Kharagpur to develop the overall framework of a facility that can provide a single window access to learners for e-contents/resources. e-Yantra is a project entrusted to IIT Bombay to enable effective education across engineering colleges in India on embedded systems and Robotics. Virtual labs provide remote access to labs across science and engineering disciplines. It allows students to perform experiments at a place and time of their choice outside lab hours. The FOSSEE (Free/Libre and Open-Source Software in Education) Project promotes using FLOSS (Free/Libre and Open-Source Software) tools to improve the quality of education. Spoken Tutorial helps you learn free/licence and open-source software yourself. The self-paced, multilingual courses can be assessed through the computer and learned from any place, at any time, and in a language of their choice. It is important to note that the Internet does not require spoken tutorials. National

Academic Depository (NAD) is an online storehouse of academic awards (degrees, diplomas, certificates, mark sheets, etc.) lodged by the academic institutions/school boards/eligibility assessment bodies in a digital format; it is available on 24X7 online modes.

The Annual Refresher Programme in Teaching (ARPIT) is an initiative for the online professional development of 15 lakh higher education faculty members using the MOOCs platform SWAYAM. It is evident that the faculty accepts the digitisation and subsequent changes that come along with it; they must be ready to accept the challenges as well as prepare themselves for being the learners of the 21st century; they should be aware of the integration of new technology into the teaching-learning process; they should also motivate students to benefit from digital initiatives. The government has launched an e-learning platform to support education and reach the maximum number of students across India through various initiatives. DIKSHA is an initiative of the National Council of Educational Research and Training (Ministry of Education, Gov. of India); it is the national platform for School Education. It provides courses and learning materials for teachers and students, which can be accessed through a mobile app and a web portal. (PM eVidya. DIKSHA. Retrieved from <https://pmevidya.education.gov.in/diksha.html>). ePathshala is a portal/app developed by the CIET and NCERT. It was initiated jointly by the Ministry of Human Resource Development, CIET, and NCERT and launched in November 2015. It hosts educational resources for teachers, students, parents, researchers, and educators, can be accessed on the Web, and is available on Google Play, App Store, and Windows. The content is available in English, Hindi, and Urdu. CIET, NCERT, develops the National Repository of Open Educational Resources (NROER). It was launched during the National Conference on ICT (Information and Communication Technology) for School Education.

IMPACT OF LOCKDOWN

Many affected learners are affected due to the pandemic and lockdown. The education of around 360 million students was hampered in India alone. (Times of India). There was no provisional plan for such a pandemic, so Lockdown was the only option, and all nations in the world adopted it due to the severity of the pandemic. It resulted in compulsive homeschooling. This created a burden on teachers at various levels. The shift was sudden, and teachers were forced to conduct online classes. Some were without training, although we speak about using Digital Technology at all levels of school education. Classroom teaching shifted to online teaching using communication tools such as Microsoft Teams and Zoom. It burdened teachers because they had hardly started using Technology in classroom teaching. It is important to note that we do not have a curriculum that can be fully transacted through online mode, so online teaching was a challenge not only for teachers but also for students and other stakeholders. ICT plays an important role in digital education.

We are aware of the traditional mode of learning, but now we are used to words like online, virtual, and even hybrid. When we speak about the holistic development of the learner, learning should cater to his overall needs; the teaching-learning process should be laced with vivid experiences and opportunities for the learner. Many private schools reduced the number of teachers, and there was a financial burden on the teachers. Social-emotional learning has

hampered individual students, teachers, and parents. There were many issues related to the mental health of the teachers and students. Illiterate parents were unable to help children with online education. Due to the online learning mode, practical and skill development programs/courses/training were hampered. The students found it difficult to get hands-on experience due to the limited availability of resources at home and in their surroundings; up till now, students were only confined to classroom teaching and learning, and their home as their classroom was a new environment for them. There was also a distraction from the teachers' side as it was a new experience for them. There was an issue with internet connectivity, teachers were not properly trained to use the online platforms, online content was not created properly, it was difficult for teachers to monitor all the students, and issues related to assessment and evaluation. Educational institutions could not run smoothly for nearly 18 months. Thus, classes were conducted online with the help of mobiles, tab, laptops, or computers. Many admission tests, entrance exams, final term exams, certification courses, and recruitment tests were cancelled, postponed or conducted online due to the lockdown. Various competition and competitive exams were cancelled or postponed as the education system was not ready to assess and evaluate such exams online. Some institutes conducted online examinations and assessments, but these were few. There was an option for a proctored examination to keep away malpractice and avoid cheating incidents. A proctored exam is an exam in which a person is present to monitor and supervise students during the exam. With the advent of technology, higher education institutions are open to the challenges of conducting online examinations. Even now, many entrance examinations, seminars, and conferences are conducted online for ease of participation in higher education. These changes showcase the adoption of technology to save time and money.

The pandemic highlighted the need to invest in digital technologies, such as video conferencing tools, cloud systems, and Learning Management Systems (LMS) (Consulting, India Perspective. 2021, January. Future of learning in the wake of COVID-19). Schools and higher education institutions must shift to virtual learning during lockdown. Even some institutes continued with virtual learning for students who could not attend offline classes. Although the percentage of formal learning and acquisition of desired learning outcomes differ with virtual learning. Nowadays, teachers and learners are used to learning via online mode, and the phase is termed the new normal, but it is also important that the learners' needs are fulfilled. They get vivid experiences even through digital learning. There was an emphasis on creating more interactive content, using facilitator-led live instructional training, simulations, and panel discussions for the learners. As per the Annual Status of Education Report (ASER) 2020 Wave-1 (Rural), released in October 2020, the percentage of enrolled children from government & private schools owning a smartphone increased enormously from 36.5 % in 2018 to 61.8 % in 2020 in rural India. A survey by UNICEF and the Maharashtra State Council of Educational Research and Training (MSCERT) in July 2020 revealed that only half of the state government's school students in Grades I-VIII had access to online learning facilities. NITI Aayog also reported a lack of mobile network coverage in over 55,000 villages in the country, which shows the condition of online education provision in rural areas. The following points can understand the other lacunae in the provision of online education: enrolled school children who have a smartphone at home: 36.5% in the year (2018), 67.6% in the year (2021), children's access to Smartphone at home [Access all

the time: 27%, Partial Access: 47%, No access: 26%] (Annual Status of Education Report (Rural). 2022p. 15). The 2017-18 National Sample Survey reported only 23.8 per cent of Indian households had internet access. The education ministry's budget estimate for digital e-learning was Rs 444 crore in 2020-21— the year Covid struck. The Revised Budget was Rs. 305 crores. Evidence from rural India shows substantial learning losses in math and reading. A huge drop in learning levels in both reading and numeracy is seen in primary classes. The highest reading level in the ASER assessment is text at the Std II level. The proportion of Std III children in rural Karnataka who were at grade level in 2018 was 19.2%. For children currently enrolled in Std III, this figure is 9.8%. As many as 76% of parents of children aged between 5 and 13 and 80% of adolescents aged 14 to 18 reported less learning due to school closure. The survey was conducted in six states in 2020: Assam, Bihar, Madhya Pradesh, Kerala, Gujarat, and Uttar Pradesh.

EDUCATIONAL PLANNING POST-PANDEMIC

Planning an education system that caters to the needs of the individual is a challenging task. It requires working from the grassroots level. To frame the education system as considered to reach all the learners in the society, specific steps to be followed can be as follows: evaluation of previous Education Policies in India and at the international level, evaluation of current Education Policy, and survey from different stakeholders using various techniques such as interviews, observation, checklist, proper assessment of the study and carefully noting down the need of the individual and the society in general, Framing of a new policy for Education, framing of schemes for the implementation of the education policy, implementation of the policy, setting of the committee for the evaluation of the policy, careful consideration for the evaluation of the policy, feedback of the policy from the various stakeholders, restructuring the policy as per the need from the evaluation etc. When developing educational programs or schemes, it's important to take into account scenarios such as pandemics or lockdowns.

CONCLUSIONS

Lockdown made us realise that the many facets of online cannot be ignored as it was the only way to deal with such a situation; it is a means of learning content and communication skills. With online machine learning and artificial intelligence integration, we can bridge the learning gap among students. It is essential that schools use maximum IT resources to enhance learning and bridge the learning gap. Digital learning has become acceptable even in the post-pandemic scenario; we have witnessed so many certificates, diplomas, graduates, post-graduate programs and now even research degrees offered online. Digital learning allows us to take courses in different countries. There is the use of practical educational models that integrate technology such as AI and Machine Learning, and it is combined with traditional pedagogy and academic values. Students, teachers, and faculty are experiencing technology in greater depth to enhance learning. It is crucial to prepare our mindset for any such pandemic situation and continue using digital initiatives, which we only adopted as it was the only option in the pandemic and lockdown situation. For the schools and higher education institutions, if they wish to continue with the digital initiatives, they must continually seek to train the teachers to use the new digital tool in classroom teaching as well as maintain the infrastructure that best suits the transaction of digital

education. Efforts should be made to motivate teachers and faculty to become lifelong learners so that they can instil this same value in the learner. (India Today). Technology has the advantage of saving time nowadays it is easily accessible, and we know the number of activities which we carry out with just the use of a handheld Smart Phone, we pay bills we do not need to carry cash, we book tickets, we fill examination forms and admission forms, we pay online fees, students and teachers learn online courses, we use various Apps to enhance our learning. The internet is crucial for digital learning and to carry out the processes mentioned above. Schools and higher education institutions have adopted and are equipped with the infrastructure that supports digital learning; they are aware that using digital technology leads to improved learning outcomes.

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CHAPTER SEVEN

THE ROLE OF DIGITAL LEARNING IN SKILL DEVELOPMENT AND EDUCATION TRANSFORMATION

Nandkumar Digamberrao Balure

ABSTRACT

Upskilling is essential to keep pace with the rapid technological advancements and the evolving demands of digital learning. Technology-driven transformations have revolutionised sectors worldwide, including education, where digital tools have reshaped traditional learning paradigms. India's Digital India programme emphasises the leverage of technology to enhance skill development and empower individuals with digital proficiency. Digital learning has emerged as a vital component of this initiative, offering flexibility, accessibility, and diverse tools to enrich the learning experience. It facilitates seamless collaboration, enables skill acquisition irrespective of geographical boundaries, and fosters critical thinking essential for career growth. Virtual classrooms, gamified learning, and simulations are some methods that increase engagement and knowledge retention. Learners can also utilise dedicated platforms to access documents, participate in quizzes, and watch videos for a dynamic learning experience. Moreover, mobile learning through smartphones and tablets has gained prominence, further enhancing accessibility and convenience. This chapter explores Digital India's vision, the role of digital learning in education, and the tools and strategies driving skill development in the 21st century. It emphasises digital learning as a transformative force for equipping individuals with the skills needed to thrive in a rapidly changing environment world.

Keywords: Research, Academic Journals, Scientific Networks, Systematic Review

INTRODUCTION

The 21st century has ushered in an era of unprecedented technological advancement, redefining how knowledge is created, shared, and consumed. Among these transformative changes, digital learning has emerged as a cornerstone for revolutionising education and skill development. Traditional methods of teaching, while foundational, are needed to meet the dynamic demands of

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modern learners or the evolving workforce. With the integration of advanced digital tools and platforms, education is undergoing a paradigm shift, offering learners greater flexibility, accessibility, and engagement (Barocas et al., 2019).

Digital learning extends beyond the boundaries of classrooms, providing opportunities for personalised and immersive educational experiences. It enables learners to acquire new skills and adapt to the rapidly changing demands of industries, ensuring that they remain relevant and competitive in a technology-driven global economy. Moreover, it addresses diverse needs by catering to students in urban centres, rural areas, and remote locations, creating a more equitable learning landscape.

India's Digital India initiative is a testament to the country's commitment to embracing this change. Focusing on digital infrastructure, accessibility, and literacy, the program aims to equip individuals with the necessary skills and tools to thrive in a knowledge-based economy. This initiative underscores the importance of integrating technology into education to foster innovation, bridge socio-economic gaps, and empower citizens.

As industries worldwide increasingly rely on technology and automation, digital learning becomes ever more critical. It is not solely about acquiring technical skills but also about fostering creativity, collaboration, and critical thinking—essential attributes for navigating the complexities of the 21st-century workplace. This paper explores how digital learning is a transformative force in education, examining its roles, tools, and strategies while highlighting the challenges and opportunities that define its trajectory. By embracing digital learning, individuals and institutions can contribute to building a future-ready workforce and a more inclusive societal environment.

THE VISION OF DIGITAL INDIA

India's Digital India initiative, launched in 2015, represents a transformative vision to empower citizens through technology and establish the nation as a leader in the global digital economy. With the core objective of creating a digitally empowered society and knowledge economy, this ambitious program focuses on three key pillars: building digital infrastructure, improving online services, and fostering digital literacy across all sections of society.

Central to this vision is the belief that access to technology is a fundamental enabler of progress. The initiative aims to bridge the digital divide by ensuring that even the most remote regions of India have access to reliable internet connectivity and digital resources. Programs like BharatNet, which focuses on connecting rural areas with high-speed internet, are examples of the government's commitment to this cause.

In education, Digital India has prioritised integrating technology into learning frameworks, recognising the transformative potential of digital tools in skill development. E-learning platforms like DIKSHA and SWAYAM provide learners access to high-quality, government-curated educational content in multiple languages. These platforms cater to students, professionals, and teachers, offering resources ranging from introductory tutorials to advanced courses for

upskilling. Additionally, public-private partnerships under the Digital India umbrella have accelerated the development of EdTech solutions that address the unique challenges of India's diverse population. These collaborations enable the creation of affordable and accessible digital learning tools tailored to local languages, cultures, and needs.

The program also emphasises fostering digital literacy among citizens through initiatives like the Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), which aims to make at least one member from every rural household digitally literate. By equipping citizens with the knowledge and confidence to use digital tools effectively, the initiative ensures that the benefits of digital learning and skill development are distributed equitably.

The vision of Digital India extends beyond infrastructure and tools. It aspires to create a digitally inclusive society where every individual can thrive in a knowledge-driven economy. By embedding technology into the fabric of education and skill development, the initiative lays the foundation for a future-ready workforce that can compete and innovate globally.

THE ROLE OF DIGITAL LEARNING IN EDUCATION

Digital learning is not just a tool for delivering education; it is a transformative approach that redefines how knowledge is acquired, processed, and applied. In an era marked by rapid technological advancements and dynamic workforce demands, digital learning has emerged as a vital mechanism to prepare learners for the complexities of the modern world.

One of digital learning's most significant advantages is its ability to provide flexible and personalised learning experiences. Unlike traditional education systems, which often adopt a one-size-fits-all approach, digital learning platforms can adapt to individual learners' unique needs, paces, and preferences (Barocas et al., 2019). Adaptive learning systems like AI-driven platforms analyse user interactions and tailor content to ensure effective learning outcomes. This personalisation fosters deeper engagement and helps learners overcome challenges specific to their educational journeys.

Furthermore, digital learning is a powerful tool for democratising education. It bridges geographical and socio-economic divides by enabling learners in remote or underserved areas to access the same resources as their urban counterparts. Initiatives like India's SWAYAM and global platforms like Coursera and edX exemplify this by offering open access to courses from top institutions worldwide.

Collaboration and interactivity are at the heart of digital learning. Platforms such as Google Classroom and Microsoft Teams facilitate real-time communication and teamwork among students and educators, regardless of their location. Through discussion boards, shared projects, and instant feedback, learners can engage in meaningful dialogues and build critical soft skills like teamwork and problem-solving.

Additionally, digital learning encourages the development of critical thinking and creativity. By leveraging tools like simulations and gamified learning environments, students can engage with

content in ways that promote analytical thinking and innovative problem-solving. For instance, virtual labs allow science students to conduct experiments safely and creatively, while gamification makes subjects like mathematics and language arts more engaging and accessible.

The role of digital learning in education also extends to lifelong learning. Professionals seeking to upskill or reskill can benefit from online micro-credentialing and certification programs. These programs allow individuals to acquire new competencies while balancing work and personal commitments, making education an ongoing and accessible journey.

Ultimately, digital learning is not merely a supplement to traditional methods but a transformative force that aligns education with the demands of a technology-driven world. By fostering inclusivity, personalisation, and collaboration, digital learning ensures that education becomes a tool for empowerment, innovation, and sustainable development in the 21st century.

TOOLS AND STRATEGIES IN DIGITAL LEARNING

The effectiveness of digital learning largely depends on the tools and strategies employed to deliver educational content and foster engagement. These tools range from virtual classrooms to gamified learning environments and mobile learning platforms. They not only make learning more interactive and accessible but also ensure that it is aligned with the needs of the modern workforce.

Virtual Classrooms and Collaborative Tools

Virtual classrooms have revolutionised traditional teaching methods by enabling real-time interaction between educators and learners. Platforms like Microsoft Teams and Google Classroom offer various features, including video conferencing, breakout rooms, and collaborative documents, which enhance engagement and facilitate teamwork (Ng, 2020). These tools replicate physical classroom dynamics while introducing new interactive and asynchronous learning possibilities.

For instance, during the COVID-19 pandemic, virtual classrooms became the primary mode of education for millions of students worldwide, demonstrating their scalability and adaptability in times of crisis (UNESCO, 2021). Beyond replicating classroom settings, virtual tools allow educators to share multimedia resources, provide instant feedback, and track learner progress, making the learning experience dynamic and data-driven.

Gamification and Simulations

Gamified learning and simulations integrate game design elements like points, challenges, and leaderboards into educational content to increase motivation and participation. Tools like Kahoot and Quizizz are widely used to make assessments more engaging, while platforms like Labster offer virtual science experiments that simulate real-world conditions (Mehrabian et al., 2021).

Gamification promotes active participation by making learning enjoyable. Research suggests that gamified methods improve retention rates and learning outcomes compared to traditional methods

(Barocas et al., 2019). Similarly, simulations provide learners with hands-on experiences in a safe and controlled environment, enabling them to apply theoretical knowledge practically. For example, medical students can practice surgeries in a simulated environment, reducing the risk of errors when dealing with actual patients.

Mobile Learning

The proliferation of mobile devices has given rise to mobile learning, a flexible and portable approach to education. Apps like Byju's and Duolingo are prime examples of how smartphones and tablets transform learning by offering personalised, bite-sized content that is accessible anytime and anywhere. Mobile learning is particularly beneficial in rural areas where internet infrastructure may be limited, as many apps provide offline functionality (Dwork & Roth, 2014).

Moreover, mobile learning caters to diverse audiences, including professionals looking to upskill and students seeking supplementary resources. It allows learners to engage in micro-learning—consuming content in short bursts, which aligns with busy schedules and shorter attention spans (Luckin et al., 2020).

AI-Powered Tools and Adaptive Learning

Artificial intelligence (AI) plays a transformative role in digital education by personalising learning experiences. AI-driven platforms like Carnegie Learning analyse student interactions to identify knowledge gaps and adapt content accordingly (VanLehn, 2011). This ensures that each learner progresses at their own pace, maximising comprehension and retention.

AI tools provide educators with actionable insights, such as performance analytics and predictive assessments, enabling data-driven decision-making. However, the success of such tools relies heavily on ethical considerations, including unbiased algorithms and secure handling of learner data (Barocas et al., 2019).

By combining these tools and strategies, digital learning creates a holistic educational experience that is engaging, accessible, and tailored to learners' unique needs. This approach ensures students and professionals have the skills to thrive in a rapidly evolving world.

OVERCOMING CHALLENGES IN DIGITAL LEARNING

While digital learning offers numerous benefits, its implementation is challenging. To fully realise its potential, several obstacles must be tackled, from addressing the digital divide to overcoming technological resistance. Practical strategies and collaborative efforts are required to ensure that digital learning becomes an inclusive and impactful solution for all.

Bridging the Digital Divide

One of the most significant challenges in digital learning is the digital divide, which results from inequitable access to technology and internet connectivity. Rural and underserved areas often lack the infrastructure necessary to support digital education. A 2021 report by UNESCO highlighted that approximately 50% of the global population still lacks access to reliable internet services, severely limiting their ability to engage with digital learning platforms (UNESCO, 2021).

To address this, governments and private organisations must invest in infrastructure development. Initiatives like BharatNet in India aim to provide high-speed internet connectivity to rural regions, bridging the gap between urban and remote learners. Subsidising devices and internet services can make digital tools more accessible to economically disadvantaged groups.

Overcoming Resistance to Technology Adoption

Another challenge is the resistance to adopting technology, particularly among educators and learners accustomed to traditional methods. Many teachers feel apprehensive about using digital tools, citing concerns about complexity, lack of training, and fears of being replaced by technology (Luckin et al., 2020).

To alleviate these concerns, targeted professional development programs that equip educators with the skills and confidence needed to integrate digital tools into their teaching are essential. Highlighting success stories and offering continuous support through helplines or online communities can further ease this transition. Additionally, demonstrating how digital learning complements rather than replaces traditional teaching can foster greater acceptance.

Ensuring Content Relevance and Inclusivity

The effectiveness of digital learning also depends on the relevance and inclusivity of the content offered. Standardised curricula often fail to address learners' diverse linguistic, cultural, and socio-economic contexts. For example, platforms that only provide content in English can alienate non-English-speaking populations, limiting their engagement (Barocas et al., 2019).

Creating multilingual and culturally sensitive content is crucial for ensuring inclusivity. Platforms like DIKSHA in India cater to diverse audiences by offering resources in multiple regional languages. Collaborating with local educators and communities can further enhance the relevance of digital learning materials.

Addressing Privacy and Security Concerns

Digital learning platforms often collect large amounts of user data, raising concerns about privacy and security. Mishandling or unauthorised use of this data can lead to breaches of trust and compliance. A study by Dwork and Roth (2014) emphasised the importance of implementing data minimisation techniques and robust encryption methods to protect user information.

Educational institutions and technology providers must establish transparent data policies that clearly outline how user data is collected, stored, and used. Adopting frameworks like differential privacy can help ensure that personal information is safeguarded while allowing meaningful analysis.

Scaling Digital Learning Solutions

Ensuring scalability is another critical challenge, particularly in resource-constrained settings. Many digital learning tools require significant investment in hardware, software, and training, which can be prohibitive for smaller institutions or regions with limited budgets.

Promoting open-source platforms and mobile-first solutions can address these constraints. Open-source tools like Moodle provide customisable and cost-effective alternatives to proprietary systems. Mobile-first strategies leverage the high penetration of smartphones to deliver educational content, even in regions with limited infrastructure.

By addressing these challenges through targeted interventions and collaborative efforts, digital learning can become a transformative force. Overcoming these obstacles will ensure that learners across geographies and socio-economic backgrounds have equitable access to the opportunities offered by digital education.

CONCLUSION

Digital learning has emerged as a transformative force in modern education, offering unprecedented opportunities to enhance access, engagement, and skill development across the globe. As industries and societies increasingly rely on technology, the need for upskilling and lifelong learning has become essential. Digital learning platforms allow learners to acquire new skills at their own pace, break down geographical barriers, and access personalised, interactive educational content. Learners have the competencies necessary to thrive in an ever-evolving digital economy through virtual classrooms, gamified learning, and mobile-based tools.

The Digital India initiative is a prime example of how technology can be harnessed to drive educational reform and skill development. By focusing on infrastructure, digital literacy, and accessible learning resources, this initiative has opened new avenues for individuals from diverse backgrounds to engage with technology-driven education. The government's commitment to bridging the digital divide ensures that even those in remote or underserved areas can benefit from digital learning opportunities.

However, the journey to fully realising digital learning's potential is not without its challenges. Bridging the digital divide, overcoming resistance to technology adoption, and ensuring the inclusivity of content remain key obstacles that need to be addressed. Collaboration between governments, private sector stakeholders, and educational institutions is essential to tackling these challenges and creating a more inclusive and equitable learning environment. Additionally, addressing data privacy and security concerns is crucial for maintaining trust in digital platforms.

Despite these challenges, digital learning's benefits far outweigh the obstacles. As we explore innovative ways to integrate technology into education, digital learning will remain a central pillar of skill development, empowering individuals to succeed in a rapidly changing world. By embracing and scaling digital learning solutions, societies can ensure that future generations are equipped with the knowledge, creativity, and critical thinking skills needed to navigate the complexities of the 21st century.

In conclusion, digital learning is a tool for educational advancement and a cornerstone of a brighter, more inclusive future. The ongoing efforts to integrate technology into education promise to create a more skilled, adaptable, and innovative workforce, which is essential for building a sustainable, knowledge-driven global economy.

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CHAPTER EIGHT

INNOVATIVE PATHWAYS IN ACADEMIA: DIGITAL UNIVERSITIES SHAPING THE EDUCATIONAL HORIZON

Nishta Rana and Sonia Chaudhary

ABSTRACT

The rapid pace of digitisation is driving a paradigm shift in education, particularly in higher education. Higher education institutions are swiftly adopting and integrating modern technologies to remain at the forefront of the digital landscape and distinguish themselves as digital leaders. The advent of digital universities marks a transformative era in education, heralding a new era characterised by unprecedented accessibility, flexibility and innovation. This paper comprehensively explores digital universities, elucidating their core nature. This paper aims to profile notable digital universities globally, emphasising their unique contributions to the evolution of education. A pivotal aspect of this exploration is the distinction between digital universities and traditional institutions, emphasising their abilities to transcend physical boundaries and operate in a dynamic virtual ecosystem. This study delves into the dynamic influence of digital universities, highlighting their role as hubs of innovation, incubating cutting-edge research and driving advancements. The paper also addresses critical concerns faced in establishing and operating digital universities along with their opportunities. The paper concludes by encouraging a forward-thinking approach to the future of digital education to leverage the full potential of digital universities in shaping the next era of education, positioning digital universities as crucial drivers of educational progress in the 21st century.

Keywords: Digital Universities, Accessibility, Innovation, Digital Platforms, Technology Integration

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INTRODUCTION

In the rapidly evolving landscape of digital education, the traditional constraints of physical campuses are giving way to a new paradigm. Cawood (2018) and Wildan Zulfikar et al. (2018) describe some of the drivers of change that will shape the university of the future, which include increasing competition, digital behaviour, changes in work, global mobility, democratisation of knowledge and access, continuous learning, and removal of boundaries within industries. Higher education institutions (HEIs) are involved in the evolution of a new model of university called Digital University. The advent of Digital Universities has emerged as a transformative force paving the way towards a new era in learning. As technology continues redefining traditional education's boundaries, Digital Universities stand at the forefront, reshaping how knowledge is disseminated, acquired and applied. This model implies adopting new technologies and developing an organisation's strategic transformation, including information, processes, human aspects, and more. A digital university is an institution of higher learning that harnesses the power of technology to enhance the learning experience. They use digital platforms to deliver course content and facilitate interaction between educators, students and course materials.

According to Dr. Saurabh Mishra, Associate Professor, Computing Science, University of Glasgow - "A digital university is the intersection of technology, pedagogy and content."

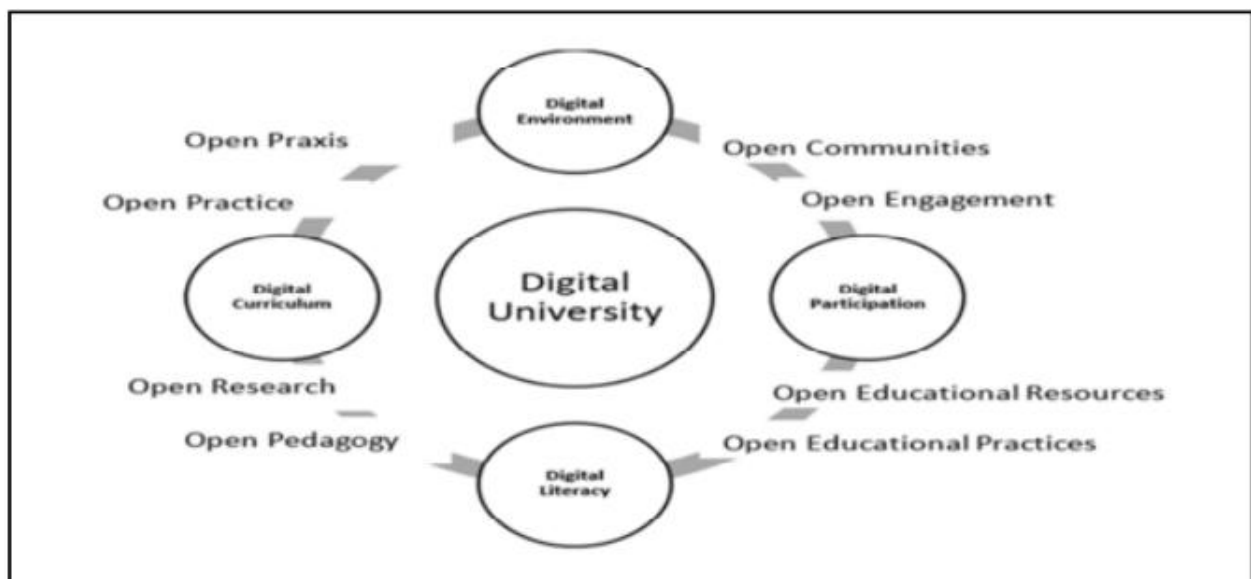


Figure 1: The Hypothetical Model of Open Digital University adapted from Johnson, MacNeill and Smith (2018)

According to Johnston & MacNeil (2013), a digital university consists of the following interconnected components: learning environment, curriculum and course design, digital literacy and digital participation, as shown in Figure 1 (Grosbeck et al., 2019). In simplest terms, as the name suggests, a digital university is a university that functions entirely through the digital mode, i.e. with the use of internet facilities. So, in the digital university, the process of teaching and learning for all the courses is taught using ICT measures (digital and electronic measures) in the virtual mode. This is very similar to the idea of online education courses, except that a digital

university is a fully-fledged central university that will exclusively provide students with various courses in various formats: Degree courses, Diploma courses and certificate courses. This institution is also known as Telematics University or Virtual University because they don't have physical locations besides the administrative building. Technically, it is a geographically non-located environment, offering integrated affordances for learning and communication through digital devices (Bomsdorf, 2005). So, the idea of a digital university is an innovative amalgamation of several educational frameworks in India- Online learning, Open Distance Learning (ODL) and edtech measures. Pedagogically, it is a subspace of what we understand as the learning space, i.e., students learn in physical, hybrid, and digital spaces, which often interact (Ellis & Goodyear, 2016).

Digital universities will operate in a HUB & SPOKE model, wherein knowledge dissemination will be extended from a central location to the various outreach centres.

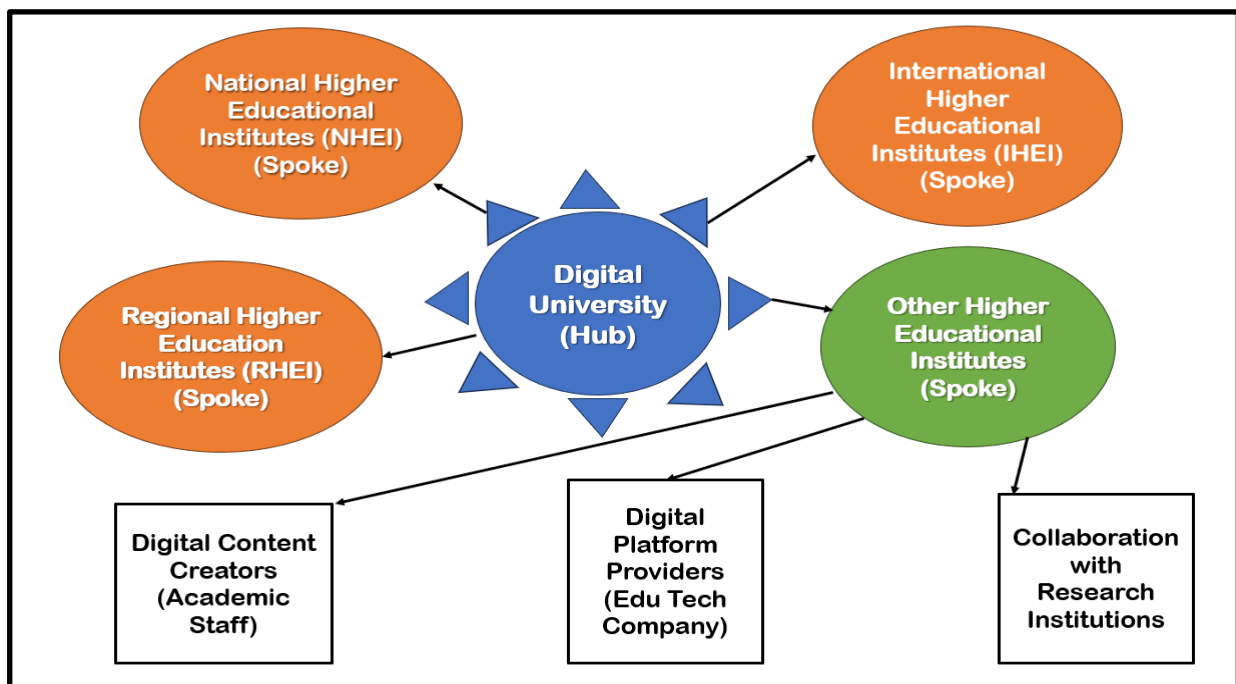


Figure 2: Hub-Spoke Model of The Digital University Ecosystem

According to some, a Digital University is a response to the significant movement toward new technology since “Digital is here and it is here to stay and significantly more profoundly evolve” (MacNeill & Johnston, 2013). The idea of a “Digital University” is fundamental to how institutions may remain competitive and relevant in the modern world. “These colleges fail to see that all they need is a business plan appropriate for the digital era; they do not require a digital strategy” (PWC, 2015). Digital universities, at their core, prioritise accessibility, flexibility and innovation, fostering an environment where learning knows no geographical limits. Digital universities' foundations are based on scientific and educational networks, knowledge management, competitiveness, accountability, and open education. Their foundations are ICT, knowledge management, and evidence-based decision-making. The values are based on digital transformation, leading to the development of intelligent digital organisations relying on network

activities and ICT synergies (Berman, 2012; Hazemi, Hailes, & Wilbur, 2012). They promote the establishment of virtual research teams and international collaborations through scientific and social media platforms. E-learning systems, internet communicators, and network software in the cloud are used for communication and cooperation with students. Informatics and management play a dominant role in the disciplinary discourse of digital universities.

GLOBAL PIONEERS: A GLIMPSE INTO NOTABLE DIGITAL UNIVERSITIES WORLDWIDE

In the ever-expanding landscape of digital education, certain institutions stand out as global pioneers, pushing the boundaries of traditional learning. These notable digital universities, scattered across the globe, have become trailblazers in redefining the educational experience. Some of them are:

- European Digital University: A pioneer in Blockchain Education. Its vision is towards a blockchain world free from fraud and corruption.
- MIA Digital University (Barcelona, Spain) is a cutting-edge Business school offering master's and certificate programs in digital marketing and related fields. Some of the courses offered include master's degrees in AI, machine learning, and Innovation Technology.
- University College London- 20 fully online programmes: online teaching degrees, online medicine degrees and more.
- Columbia University- 12 fully online programmes (online business degrees and more).
- University of Edinburgh- 66 fully online programmes: medicine degrees, online law degrees, online social science degrees and more.
- John Hopkins University has 88 fully online programmes, including online engineering degrees, online natural sciences degrees, online computer science degrees, online business degrees, and more.
- Technological University: FORBES calls TECH University “the world’s largest online university.” It offers the widest range of online postgraduate programmes (More than 10,000 programmes in ten different languages), including Sports Science, Law, Design, Education, Nursing, and the School of Languages.
- The University of Manchester has 32 online programmes, including online medicine and business degrees.
- Northwestern University- 12 fully online programmes: online Medicine degrees, online Social Science degrees, online law degrees and more.

- King's College London- 25 fully online programmes: online Medicine degrees, online Social Science degrees, online Law degrees and more.
- University of California, Los Angeles- 10 fully online programmes, online Engineering degrees and more.
- University of Sydney- 28 fully online programmes: online Medicine degrees and more.
- Monash University has 33 fully online programmes: online medicine degrees, online teaching degrees, and more.
- University of Texas at Austin- 10 fully online programmes: online Engineering degrees, online Computer Science degrees and more.
- University of Glasgow- 22 fully online programmes.
- The Budget 2022-2023 announcement states that a central digital university will be established. A digital university will provide access to high-quality higher education in various Indian languages, coinciding with the objectives outlined in the National Education Policy 2020. As of now, there are two digital universities in India:
 - 1) The first digital university in India is the Kerala University of Digital Sciences, Innovation and Technology, established on 18th January 2020 by modernising the Indian Institute of Information Technology and Management, Kerala (IIITM-K). It is a state university in Thiruvananthapuram, Kerala.
 - 2) The Rajasthan government has approved the establishment of another digital university, Rajiv Gandhi Fintech Digital Institute, in Jodhpur.

DECODING THE CONTRAST BETWEEN DIGITAL AND TRADITIONAL UNIVERSITIES

The contrast between digital and traditional universities is evident in how education is delivered and experienced. It can be decoded through various aspects, such as the use of technology, the delivery of education, and the learning experience. However, a digital university is very similar to online courses, except that it provides students with various courses in various formats: degree, diploma, and certificate.

- Educational delivery methods: Digital universities leverage cutting-edge technologies to provide flexible, accessible, and high-quality education to students from all walks of life. They offer online and in-person learning experiences, promoting lifelong learning and breaking educational barriers. In contrast, traditional universities typically rely on in-person, classroom-based teaching and learning, with less emphasis on flexible and accessible education.

- Comprehensive digital integration vs. linear academic focus: A digital campus means more than e-learning; it includes e-presence and e-university administration (Moşteanu, Faccia, & Cavaliere, 2020c). It involves all academic and administrative activities conducted by the university and is not limited to teaching, learning, and research (Moşteanu, 2020c; Dynasign Campus Live in Action, 2014). On the other hand, traditional universities typically maintain a more linear approach, primarily focusing on conventional teaching, learning, and research paradigms.
- Technology Integration: Moreover, immersive technologies are a clear distinction. Generally, AR and VR may also be utilised to create interactive and gamified learning experiences for students, making the learning process more engaging and pleasurable (Chan et al., 2022). Traditional Universities rely on conventional teaching aids and make limited use of advanced technologies.
- Physical presence: Digital universities operate in a virtual space, transcending physical boundaries, whereas traditional universities primarily rely on physical campuses for education and administration.
- Teaching methodologies: Digital universities utilise diverse digital tools, personalised learning, and interactive approaches. Traditional universities, on the other hand, rely on in-person lectures and conventional teaching methods.
- Administrative processes: Digital universities streamline administrative tasks and e-university administrative systems. In contrast, traditional universities often involve manual administrative processes and paperwork.
- Global Collaboration: Digital Universities foster international collaboration among students and researchers, whereas collaboration is often restricted to a local or regional level in traditional universities.
- Student Engagement: Digital Universities emphasise interactive and engaging online learning experiences. In Contrast, traditional Universities rely on face-to-face interactions, which can potentially limit student engagement.
- Resource Accessibility: Digital Universities embrace open educational resources and online libraries for easy access, whereas traditional Universities provide access to resources that may be confined to physical libraries and limited online databases.
- Cost Structure: Digital Universities may have a different cost structure due to reduced physical infrastructure needs, while traditional Universities typically involve high infrastructure costs for maintaining physical campuses.
- Career Readiness: Digital Universities often emphasize industry-relevant skills through collaborations with tech companies. In contrast, traditional Universities may follow a more traditional curriculum and potentially need to adjust it for industry alignment.

INNOVATE OR PERISH: DIGITAL UNIVERSITIES AS INNOVATION HUBS

Digital universities worldwide serve as innovation hubs, leading transformative educational paradigms. This exploration explores how these institutions spearhead innovation, leveraging technology to redefine teaching-learning and the overall academic experience.

- **Effective Technology Integration:** Digital transformation is based on innovative technologies, so another important aspect of digital universities is the widespread integration of digital tools and online platforms that have fundamentally transformed education globally. Fig 3 shows the emerging technologies used mainly by 82 Digital Transformation Initiatives (DTIs) worldwide. The digital university in India can integrate the existing capabilities such as SWAYAM, SWAYAM-Prabha, ePG-Pathshala, eGyanKosh, National Digital Library, and Virtual Labs into one organic entity. This hub can then collaborate with the best public higher educational institutes, such as the IITs, IIMs and central universities, to provide an affordable, world-class teaching-learning ecosystem.

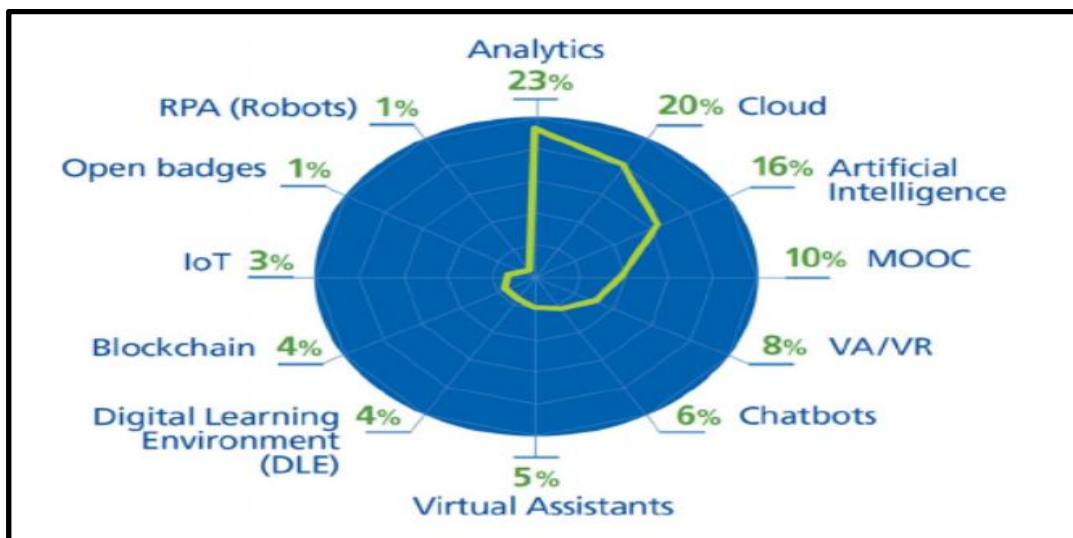


Figure 3: Emerging Technologies Most Used By 82 DTIs

- **Research output:** Digital Universities like MIT's OpenCourseware showcase prolific research output. Their commitment to sharing knowledge globally fosters innovation and stays relevant in an ever-changing educational ecosystem.
- **Enhanced Student Experience:** The main goal of a digital university is to improve the student experience and satisfy their emergent demands. They aim to increase and simplify student interaction, help them evaluate their potential, and advise them about future courses.
- **Industry Collaboration:** Universities collaborating with industries, such as Carnegie Mellon's partnerships with tech giants, exemplify how digital universities act as innovation hubs. By engaging with technology companies and other sectors, digital

universities ensure that their curricula stay relevant to the evolving demands of the job market. This collaboration drives advancements, ensuring graduates are equipped with real-world skills. For Example, The innovative technology company ‘PRECISO’ and the AI chip centre at Digital University Kerala announced their collaboration on December 5, 2023. Universities have established integrating the IT department with other parts of the organisation (Harvard University, 2015; University of Wisconsin-Stout, 2018; University of York, 2018; Woods & Lloyd, n.d.). This way, the role of the IT department shifts from a purely technical role to an advisory one by further disseminating the digital strategy and increasing the demand for customer-focused skills.

- Student-led initiatives: Platforms like Harvard’s Innovation Labs empower students to lead initiatives, fostering a culture of innovation within digital universities. These initiatives often lead to startups and groundbreaking projects.
- Increase and simplify students’ interaction with staff and coaches (44%). Automated support has not left behind strategies to increase student communication with coaches and academic staff (Harvard University, 2015; Powell et al., 2015; Queensland University of Technology, 2016; Spies, 2017), to support each other through online communities where specific knowledge is disseminated (Del-gado-Kloos & Alario-Hoyos, n.d.; Dunagan, 2017; University of New South Wales, 2020) or through the implementation of an Intranet (King’s College Lon-don, n.d.; University of Leicester, 2018).
- Global collaboration for research: To increase digital capabilities, HEIs are creating spaces for collaboration and real-time interaction, training and research (Delgado-Kloos & Alario-Hoyos, n.d.; Obaid, 2019; University of Auckland, 2020). These institutions leverage online platforms to facilitate global collaboration among researchers. For instance, researchers from different countries can collaborate seamlessly, leading to a diverse exchange of ideas and perspectives.
- Pedagogical innovations: Digital universities adopt personalised learning approaches, tailoring education to individual needs. This is supported by empirical evidence showing improved student engagement and comprehension.
- AI-driven adaptive learning: AI-powered adaptive learning systems analyse student performance data to provide personalised feedback and suggest tailored learning paths. Studies demonstrate the positive impact of AI-driven personalised learning on student outcomes.
- OERs and MOOCs: Digital universities also embrace open educational resources and Massive Open Online Courses, democratising access to quality education globally. This accessibility fosters a culture of inclusivity and lifelong learning.
- Immersive technologies in education: The integration of virtual reality and augmented reality technologies enhances the learning experience. Augmented reality and virtual reality can significantly improve the educational experience and make learning more

interactive, immersive, and effective (Solmaz et al., 2021). Research indicates that these immersive technologies improve retention and understanding by creating interactive and realistic educational environments.

- **Process Oriented:** The digital education stream is process-oriented and deals with the digital classrooms and LMS, the provision of digital materials, such as PowerPoints and video presentations, and the communication of learning outcomes, assignments, and exams. Massive Open Online Courses (MOOCs) had a breakthrough in 2012 (Kaplan & Haenlein, 2016; Siemens et al., 2015). Introducing new technology-assisted learning tools such as mobile devices, smartboards, MOOCs, tablets, laptops, simulations, dynamic visualisations, and virtual laboratories has significantly altered education in schools and institutions. For example, the Mongolian University of Science and Technology has been driving digital transformation by adopting virtual learning environments and online assessment tools. In addition, various digital education tools, such as Edmodo, Socrative, Projeqt, Thinglink, and TED-Ed, have been widely adopted by teachers and students to enhance the learning experience, encourage collaboration, and facilitate personalised learning.
- **AI Integration:** Stanford University and other leading institutions have embraced technological advancements, such as integrating AI and Machine Learning, to revolutionise education. Universities, notably Stanford, leverage AI and machine learning for personalised education, enhancing the learning experience and boosting student engagement.
- **Emphasis on Personalized, Lifelong Education:** Universities, including Stanford, actively foster innovation, adaptability, and personal growth. This prepares students for success in a globalised and interconnected world.
- **Online Courses and Digital Libraries:** Technological innovations have democratised education, making online courses and digital libraries accessible worldwide. This accessibility promotes global collaboration and facilitates the exchange of knowledge across borders.
- **Problem-based learning and gamification:** Digital universities are incorporating problem-based learning and gamification into their curricula to engage students and encourage them to apply their knowledge in real-world situations.

CHALLENGES AND CRITICAL CONCERNS IN THE WORLD OF DIGITAL UNIVERSITIES

While the realm of digital universities opens new educational frontiers, it has its share of challenges and critical concerns. Thomas Gkrimpizi and Vassilos Peristeras (2022) identified 22 barriers to the digital transformation of HEIs in Indonesia, which they subsequently classified into nine groups (vision, strategy and policy, resources, leadership, digital skills and knowledge, technology, adaptability, resistance to change, and government and economic). In addition, they grouped the above barriers into four categories: Contextual, Social, Technical and Cultural barriers. The authors found that the focus on the short-term outcome and insufficient prioritisation of investments, decentralised decision-making, internal resistance, and digital literacy of academics fed by the generation gap of digitally native students are some of the most significant barriers to digital transformation in HEIs. One study addressed the degree of digital transformation maturity in HEIs in the United Arab Emirates. This study revealed that the lack of holistic vision, digital transformation capability, data structure, and processing are the top challenges of the digital transformation of HEIs. Some challenges are as follows:

- Contextual: Lack of Strategy, lack of vision, Lack of Policy and Action Plan, Lack of prioritisation plan, Lack/Insufficient funds, Legislation and guidelines, Organizational complexity, Lack of organisational agility, Silos, Lack of Management support, Legal issues/ownership/copyright laws.
- Social: Lack of expertise in digital transformation /Lack of digital skills/Lack of digital competencies/Lack of digital literacy of academic staff/Lack of leadership for changes/Digital generation gap between academic staff and students/Lack of time to incorporate digital technology/Lack of interest in technology/Difficulties in keeping up with technological changes/Lack of organisational leadership skills.
- Technical issues include data quality, Lack of IT infrastructure, Legacy systems, Data fragmentation and diversity, IT security risk and standards, Full exploration of digital technologies in educational systems, and inadequate IT support.
- Cultural: Organizational resistance to change, Academic staff resistance to change, Lack of collaboration/communication, Lack of coordination between departments, Conservative/Bureaucratic culture, Reluctant to leave comfort zone/Inertia, Mindsets and behaviours/dominant logic, Lack of commitment.

Let's have a look at the challenges of digital universities:

- 1) Digital Divide: Various reports, such as the 75th National Sample Survey and Mission Antyodaya 2020, show dramatic urban-rural disparities. Similarly, the UNESCO 2021 report entitled “Reimagining Our Futures Together: A New Social Contract for Education” shows there is a vast digital divide in terms of access to reliable connectivity, hardware, and access to electricity, especially in rural areas. Not all students have equal access to digital resources. Expecting them to rely only on e-resources for learning at the

new digital university seems to mock their challenging economic conditions. This puts them at a double disadvantage if digital modes become the mainstay of education.

- 2) **Internet Coverage:** One of the essential requirements for digital education is the accessibility of reliable Internet connections to everyone. In a nationwide survey, 2.71% of Norwegian students replied that the learning outcome was poorer and that 50% felt lonely. Also, 71% thought education had been reduced after the lockdown in March 2020, with significant variations between institutions. The outcomes were notably worse in poorer countries, where Internet access is more scarce (Aristovnik et al., 2020). The growth of digital India is negatively impacted by intermittent Internet connectivity, frequent power outages, financial barriers to obtaining a high-speed Internet connection, and limited access to digital education.
- 3) **Accreditation & Quality Assessment:** Digital universities differ from traditional mortar universities. Different mechanisms need to be standardised for accreditation of the digital university. Adopting e-learning during the epidemic crisis was a temporary solution because both the students and the professors had little previous experience. Utilising that expertise may only be particularly helpful with a clear structure for the new digital university. A strong pedagogy, a well-designed curriculum, and qualified instructors are necessary for the latest digital university. We cannot just transfer traditional classroom methodology and material to online learning environments. We require an empirical study of digital pedagogies.
- 4) **Technical know-how:** Academic staff members need to gain digital skills to use electronic devices, which makes them less proficient at teaching online. Another problem is training teachers; they can successfully run digital classrooms only when they are well-versed in technology.
- 5) **The Peculiarity of Courses:** The education field is diverse. It would be very challenging to convert all systems completely to digital, especially laboratory-related courses, such as those related to science and technology.
- 6) **Risk of Unemployment:** Job security is vital for academic staff. They anticipate that technology will eventually supplant teachers, leading to fewer teaching vacancies.
- 7) **Fake Universities:** The concept of a Digital university may be a breeding ground for the emergence of many fake universities, such as “The Digital University of Skill Resurgence,” Wardha, Maharashtra. In this case, the University Grant Commission declared it a fake university in a public statement. However, in practice, it is pretty challenging to cross-check all of these types of bogus universities in a timely manner.
- 8) **Data Awareness Challenge:** Digital universities have overcome transportation issues, but a lack of awareness about data and information remains a challenge. Removing myths and justifying the facts with evidence is a big challenge.

- 9) **Cybersecurity Concerns:** Cybersecurity and fraudulent websites can also distract learners and aspirants from acquiring knowledge and skills. So, ensuring safe access to the digital world is also a challenge.
- 10) **Issue of hub congestion:** The digital university concept is based on the hub-spoke model, where the hub or central network circulates accurate information to different spokes. In that case, the network may collapse, or network congestion might occur, interrupting the prescribed curriculum. This may hamper the total system of imparting knowledge and skill.
- 11) **Issue of device unavailability:** As we all know, India is a developing country, and 60% of the population lives in rural areas. Many rural learners lack mobile phones or smartphones. A survey shows that 27.9% of households bought smartphones for kids to study amid the pandemic. According to the Annual Status of Education Report (ASER) survey, the availability of smartphones in rural India was 36.5% in 2018, which increased to 61.8% in 2020 and 67.6% in 2021.
- 12) **Increased dependency on the hub:** The hub is the central point for initiating all the programmes to respective spokes, branches, or educational institutions in the field of teaching and learning. The dependency rises in terms of all managerial decision-making and the implementation of policy and code of conduct. Schedule management is a part of a digital university that is difficult to manipulate in critical circumstances.
- 13) **The concepts of AI, AR, and VR need promotion** to create an environment of digital innovation. AI (Artificial Intelligence), AR (Augmented Reality), and VR (Virtual Reality) are the major concepts, but many illusionary myths float in the real world and less developed countries. So, a serious awareness check to break all the myths regarding these concepts requires eradicating the fear of cybercrime and building confidence and faith in digital transformation.
- 14) **Digital Infrastructure Support:** Digital universities rely heavily on robust technological infrastructure encompassing networks, servers, and software systems. However, bandwidth limitations, server downtimes, cyber security threats, and the need for continuous updates pose significant challenges. Adequate financial investment is crucial to maintaining a cutting-edge digital infrastructure.
- 15) **Organisational challenges:** Implementing digital strategies requires a synchronised effort from various university departments, including administration, academic faculties, and IT. Coordination and communication are critical. Resistance to change, a lack of uniformity in digital adoption, and the need for training programs can impede the smooth integration of digital solutions across all university aspects.
- 16) **Technical challenges:** Technical challenges in digital universities pertain to the intricacies of implementing and sustaining digital systems. They encompass maintainability and scalability (ease of system upkeep and the system's ability to handle growing demands

effectively), autonomy and efficiency (providing interdependence to different departments and ensuring streamlined processes for optimal performance), and robustness and reliability (the system's ability to handle unexpected situations and focus on consistent and dependable system operation).

- 17) Meeting deadlines: Timely delivery of educational content, assessments, and administrative tasks is crucial in the context of digital universities. Technical issues, logistical challenges, and a diverse student population with varying resource access can pose hurdles in consistently meeting deadlines.
- 18) Optimum use of available resources: The challenge lies in the past decade's struggle for optimal resource use in digital universities, especially during the COVID-19 pandemic. Scarce resources, disruptions, and threats highlight the need for efficient use of land, labour, capital, human resources, and information. The shift to digital education necessitates strategic alignment to achieve the nation's goal of digital universities, ensuring quality education and social well-being. It is also like putting the right intellect in the right place.
- 19) Fibre Infrastructure Challenges: Protecting and maintaining optical fibre, which will be used as a web for data communication, is challenging. There is a risk of rat bites.
- 20) Personal Training: Setting up a digital university requires trained personnel to handle digital platforms on a priority basis, which is a concern.
- 21) Digital Infrastructural Support: We are well versed with the present infrastructural support in our educational institutions. Most colleges need more libraries, labs, computer labs, internet availability, and information and communication technology support. Establishing a digital library and ensuring the availability of e-materials to learners at their doorstep is the raison d'être of the digital university, which is a challenging task. They provide guidance and assistance whenever required by experts and experienced personnel in their respective fields.
- 22) Addressing psychological issues: The digitisation of the university may result in difficulties in addressing psychological issues that necessitate face-to-face interaction, which helps foster the bond learners feel with their tutors as role models. Therefore, guiding the emotions of learners effectively poses a challenge in a digital university.
- 23) Need training: The current budget introduced the concept of digital teachers, which is an interesting and challenging task. To be a digital teacher, a teacher must be equipped with the technological knowledge, skills, and expertise to handle educational tools and devices. This requires a rigorous, technological, professional skill development training programme at all levels of education.
- 24) Terms and conditions: As per the budget announcement, the digital university will provide students with access to world-class quality education with ISTE standards, regarding the

collaboration of the best public universities & institutions in the country as a hub-spoke network. But what will be the terms & conditions of this collaboration are challenging to decide. Setting a Memorandum of Association takes a lot of work to finalise. It must ensure the development of Corporate Social Responsibility of different stakeholders and not mere profiteering of corporators & higher authority.

25) No clear roadmap: Digital universities grapple with the absence of a defined roadmap in Certain places, hindering strategic planning, resource allocation and long-term vision in the rapidly evolving digital education sphere.

26) Information consistency and reliability: Information is a significant resource, in addition to land, labour, and capital. So, establishing a digital university meets numerous challenges, and the availability of correct and accurate data and information is one of them.

By analysing the above challenges, we can say that the vision of establishing a digital university is the best path to continue teaching- and learning in the circumstances of a pandemic as “the show must go on.” If there are severe checks on these challenges, the education sector will boom in the world of digitisation. Digitisation of higher education is now in global demand. However, the union budget also focused on skill development and vocational education, setting e-portals for skilling, re-skilling and livelihood, e.g. DESH(Digital Ecosystem for skilling and livelihood), NSQF for (National Skill Qualification Framework) for promoting sustainability, employability & continuous skilling avenues are welcoming steps proposed in the budget. The establishment of 750 virtual labs for science and Mathematics and 75 skilling e-labs for simulated learning environments provide space and accessibility to our new generation and nourish them as per global demand.

UNVEILING ADVANTAGES, HARNESSING BENEFITS IN THE DIGITAL UNIVERSITY FRONTIER

Digital universities offer numerous opportunities and benefits. According to an article published in Forbes, India’s ed-tech industry is increasing and is predicted to reach \$10.4 billion by 2025, with 37 million paying users of ed-tech tools. The Economic Times reports that India’s education technology industry’s market reach will be \$30 billion by the end of this decade. More than 90% of UK universities (Fry & Tinson, 2019) and 94% of HEI leaders (Spies, 2017) rank improving student experience as the most critical benefit of digital transformation. According to Yesner (2020), universities’ mission is to enhance the success of their students by offering them a unified experience. The advantages and opportunities provided by digital universities around the world are:

- Overcome the financial constraints of higher education: Higher Education is highly expensive and consequently unaffordable for many aspirants. On the other hand, online education is quite affordable and offers easy EMI options that allow students to pay the course fee in multiple instalments. As a result, Digital Universities help to overcome the financial constraints of higher education.

- **Transfer of Credits:** It will also be linked to the Academic Bank of Credits, which means students will have the flexibility to earn credits from various institutions. This system allows them to accumulate and depose credits, forming the basis for awarding degrees, diplomas, and certificates.
- **Streamlined Learning Experience:** The digital university can integrate all the components of the learning value chain, from the admission process to providing learning material in digital format, online interactions, continuous evaluations, and degree awards.
- **Continuous Innovation:** It is essential to realise that the digital learning space is enabled by an extensive digital infrastructure, i.e., the interconnected systems and networks of the university and other Internet resources. Research has shown that a modularised digital infrastructure offers rich opportunities for continued innovation through recombination (Henfridsson & Bygstad, 2013). This enables continuous innovation of new affordances.
- **Boundaryless Collaboration:** Organisationally, it transcends the university's physical and institutional borders. The digital learning space opens up new possibilities, such as closer cooperation with businesses, government, and other communities (Jackson, 2019).
- **Greater Youth Enrolment Rates for Higher Education:** The central aim around which the digital university establishment was anchored was to increase access to higher educational services for the youth. A digital University would enable more students to enrol in higher education, making it more democratic and equitable. A more significant number of students enrolling in such courses means that the nation has a well-educated and skilled youth that can also form a strong workforce. Moreover, digitising higher education would mean that students residing in remote, backward or underdeveloped areas also have access to quality education services irrespective of location.
- **Redefining Roles in Digital Learning:** Pedagogically, it offers the opportunity to experiment with new learning forms, such as new roles for teachers and students, exploration of large volumes of data, and the involvement of actors outside the university (Jackson, 2019). It is illuminating to describe this development as a redefinition of roles.
- **Minimal Eligibility Criteria:** Digital Universities have very minimal and basic eligibility criteria. In addition, there are unlimited seats in each course, which means that a large number of students can get the best-in-class Education services offered by the top Universities in India and Abroad.
- **Upskilling and Contribution to National Economy:** Digital University initiatives would allow students to receive training and education beyond the syllabus through internships, research programmes, experiential learning measures, and startup promotion. Moreover, with convenient short—and long-term courses available through virtual mode, even working professionals can continuously upskill themselves to hone their professional abilities with advancements in the field.

- Globalisation of education is one of the long-term goals of establishing digital universities. As a virtual domain of education, the constraints of physical relocation will be eliminated. As a result, higher education will become more globalised, with top educational institutions from across the world joining hands with Indian institutions to establish a network domain.
- Reduced Digital Divide: Digital Universities, along with initiatives such as common service centers (CSCs), the provision of affordable electronic devices, internet access, and other technological support, will enable the bridging of this digital gap in India.
- Personalised Learning Precision: Digital universities can use data and artificial intelligence to create personalised learning experiences for each student. This will lead to more tailored education that caters to individual learning styles, strengths, and weaknesses.
- Career-ready Education: Digital universities will increasingly prioritise employability and skills development to help students succeed in the job market. This will involve closer collaboration with industry partners and incorporating practical, real-world experiences into curricula.
- Networking: Digital universities will connect students from around the globe, increasing opportunities for collaboration and networking. This will facilitate the exchange of ideas and knowledge, fostering innovation and creativity in higher education.
- Accessible and affordable education: Digital universities can help break down barriers to education by offering more accessible and affordable learning options. Reducing geographical and financial constraints allows a broader range of students to pursue higher education and achieve their goals.
- Education at Your Fingertips: Digital universities provide easy and immediate access to many courses, making education just a click away.
- Data-Driven Efficiency: Leveraging data for assessment and decision-making processes enhances efficiency and ensures a systematic approach to evaluation within the digital university landscape.

CONCLUSION

The Indian educational system has seen several modifications, from the traditional Gurukul system to modern digital education. Digital Universities will establish India as a global leader in Digital education, which is a positive step. However, predicting that digital universities will take off in India would take time. The nation's digital divide must be bridged with the aid of the government & non-government organisations. The most logical action is incorporating digital technology into the established classroom structure. PM e-Vidya is one of the initiatives that aim to integrate all efforts related to digital education, such as Swayam Prabha, Diksha, e-

PGpathshala, National Digital Library, Swayam, E-yantra, and Virtual Labs as one nation, one digital platform and can be easily incorporated into the digital university. This process is known as blended learning or hybrid learning. Only higher education in India may be made equitable and of good quality. Thus, Digital universities stand at the forefront of a transformative journey, seamlessly merging technology, innovation and educational principles. By navigating through foundations, opportunities and challenges, it is clear that they are not mere knowledge providers but agents of change. Thus, overcoming barriers to digital transformation, creating effective change management plans, fostering a culture of innovation, and increasing the efficacy of digital teaching and learning are essential to maximising the potential of digital universities, positioning them as key drivers of educational progress in the 21st century.

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CHAPTER NINE

OPEN AND DIGITAL TOOLS FOR RESEARCH: PROSPECTS AND CHALLENGES

Nishta Rana

ABSTRACT

The research landscape has undergone a significant transformation with the advent of open and digital tools, presenting opportunities and challenges for researchers across disciplines. This abstract explores the prospects and challenges of using open and digital tools in research. Open tools, characterised by their accessibility, transparency, and collaborative nature, offer researchers unprecedented opportunities to access vast data repositories, collaborate with peers globally, and disseminate findings widely. Similarly, digital tools provide researchers with innovative data collection, analysis, and visualisation methods, enhancing the efficiency and scope of research endeavours. However, alongside these prospects, researchers face many challenges, including concerns regarding data privacy and security, the digital divide exacerbating disparities in access to resources, and issues related to the reliability and reproducibility of digital research outputs. This paper critically examines the interplay between the prospects and challenges of open and digital tools in research, highlighting the need for robust ethical frameworks, enhanced digital literacy, and concerted efforts to address disparities in access and participation. Ultimately, navigating the evolving landscape of open and digital tools requires researchers to adopt a forward-thinking approach that balances innovation with responsibility, ensuring that research endeavours contribute to advancing knowledge while upholding ethical principles and inclusivity.

Keywords: Open Tools, Digital Tools, Research, Prospects, Challenges, Accessibility.

INTRODUCTION

The convergence of technological advancements and evolving research methodologies has ushered in a new era of scholarly inquiry, characterised by the widespread adoption of open and digital tools (Crouzier, 2016). These tools, encompassing a diverse range of platforms, software,

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and resources, hold immense promise for revolutionising the research process, offering unprecedented opportunities for collaboration, data access, and dissemination of findings. However, alongside their transformative potential, open and digital tools also present researchers with various challenges, ranging from concerns related to data privacy and security to issues of digital literacy and accessibility. This introduction provides an overview of the prospects and challenges associated with using open and digital tools in research, highlighting the need for a nuanced understanding of their impact on scholarly practices and the broader research ecosystem. By critically examining the interplay between opportunities and obstacles, researchers can navigate the complex landscape of open and digital tools more effectively, harnessing their potential to advance knowledge while addressing ethical, social, and technical considerations.

In recent years, the proliferation of open tools, characterised by their transparency, inclusivity, and collaboration, has democratised access to research resources and fostered a culture of knowledge sharing and dissemination (Waterworth, 2020). Open tools encompass a wide array of platforms and initiatives, including open-access journals, repositories, data archives, and collaborative research networks, enabling researchers to access, reuse, and build upon existing knowledge more efficiently than ever (Harman, 2015). Similarly, digital tools have revolutionised the research landscape by offering innovative data collection, analysis, and visualisation solutions. From advanced statistical software to virtual research environments and online collaboration platforms, digital tools empower researchers to conduct interdisciplinary studies, engage with diverse datasets, and explore new research methodologies. This symbiotic relationship between open and digital tools has reshaped the research paradigm, facilitating greater transparency, reproducibility, and impact in scholarly endeavours.

DIFFERENT OPEN AND DIGITAL TOOLS FOR RESEARCH

Open and digital tools have significantly transformed the research landscape, offering various resources and platforms that facilitate multiple aspects of the research process (Crouzier, 2016). Some of the critical open and digital tools for research include:

Reference Management Tools: Software such as Zotero, Mendeley, and EndNote enable researchers to organise, store, and cite references and bibliographic information efficiently. These tools streamline collecting and managing research materials, allowing researchers to seamlessly create and format citations, bibliographies, and reference lists.

Open-Access Journals and Databases: Platforms like DOAJ (Directory of Open-Access Journals), PubMed Central, and Google Scholar provide access to a vast repository of scholarly articles, research papers, and publications across different disciplines. These open-access resources enable researchers to explore and retrieve valuable academic content without subscription barriers.

Data Analysis and Visualization Tools: R, Python, and MATLAB tools offer robust data analysis capabilities. They allow researchers to process and analyse large datasets, perform statistical analyses, and visualise research findings through graphs, charts, and interactive

visualisations. Additionally, tools like Tableau and Power BI facilitate the creation of visually engaging and insightful data representations.

Collaboration and Communication Platforms: Digital collaboration tools like Google Workspace, Microsoft Teams, and Slack support seamless communication and collaboration among research teams, enabling real-time document sharing, online meetings, and collaborative project management. These platforms foster efficient communication and knowledge sharing, particularly in distributed research environments.

Literature Search and Discovery Tools: Digital tools such as Google Scholar, ResearchGate, and Semantic Scholar provide comprehensive literature search and discovery functionalities, allowing researchers to explore scholarly articles, research papers, and relevant academic publications based on specific keywords, topics, or authors. These tools facilitate efficient literature review processes and support researchers in staying updated with the latest developments in their fields.

Open Research Repositories and Preprint Servers: Platforms like arXiv, bioRxiv, and SSRN serve as open research repositories and preprint servers. These platforms enable researchers to share and access pre-publication research outputs, including preprints, working papers, and research manuscripts. They promote the rapid dissemination of research findings and foster collaborative discussions within the research community.

Integrating these open and digital tools into the research workflow can enhance efficiency, collaboration, and knowledge dissemination. It enables researchers to leverage technology for streamlined data management, analysis, and communication, ultimately contributing to advancing research and knowledge creation.

PROSPECTS OF USING OPEN AND DIGITAL TOOLS FOR RESEARCH

The utilisation of open and digital research tools presents many promising prospects, fostering a dynamic and innovative research ecosystem (Mhlongo, Mbatha, Ramatsetse, & Dlamini, 2023). Some of the key prospects of using these tools include:

Enhanced Access to Information and Resources: Open and digital tools enable researchers to access a wide range of scholarly resources, including open-access journals, digital repositories, and research databases. Thus, they promote equitable access to a diverse range of information and knowledge resources.

Facilitated Collaboration and Networking: These tools promote seamless collaboration and networking among researchers, enabling real-time communication, information sharing, and interdisciplinary collaborations globally. Virtual research communities and digital platforms encourage the exchange of ideas, fostering a culture of collaborative learning and knowledge dissemination.

Streamlined Research Workflows and Data Management: Open and digital tools streamline research workflows, enabling efficient data management, analysis, and documentation. Researchers can leverage advanced data analytics, visualisation tools, and digital platforms to facilitate data processing, enhance research insights, and accelerate the dissemination of research findings.

Promotion of Open Access and Knowledge Sharing: Open and digital tools promote open access, transparency, and knowledge sharing, enabling researchers to disseminate their findings to a broader audience and engage in scholarly discussions with peers, stakeholders, and the public. These tools foster the democratisation of knowledge and contribute to advancing collaborative and transparent research practices.

Innovation in Research Methodologies and Practices: Integrating open and digital tools encourages the adoption of innovative research methodologies and practices, including digital data collection methods, online surveys, and interactive research platforms. These tools facilitate the exploration of novel research approaches, promoting experimentation and implementing cutting-edge technologies in research endeavours.

Global Outreach and Impactful Research Dissemination: Open and digital tools provide researchers with a worldwide platform for disseminating their research outcomes, facilitating broader outreach, and enhancing the impact of their research contributions. Digital repositories, online publishing platforms, and social media channels enable researchers to amplify the visibility and accessibility of their work, fostering greater recognition and influence within the research community and beyond.

Embracing these prospects can empower researchers to leverage the full potential of open and digital tools, fostering a collaborative, inclusive, and technologically advanced research environment that promotes knowledge creation, dissemination, and societal impact.

CHALLENGES

While open and digital tools have revolutionised the research landscape, their utilisation is challenging (Gallab, Nardo, & Naciri, 2024). Some of the key challenges in using open and digital tools for research include:

Data Security and Privacy Concerns: Digital tools may raise concerns regarding data security and privacy, especially when handling sensitive research data. Ensuring data protection, confidentiality, and compliance with data privacy regulations poses a significant challenge in open and digital research environments.

Digital Divide and Accessibility Barriers: The digital divide, characterised by unequal access to technology and digital resources, challenges ensuring equitable access to open and digital research tools. Limited access to technology infrastructure and internet connectivity hinders the participation of specific communities, exacerbating disparities in research opportunities and access to information.

Technological Infrastructure and Resource Constraints: Research institutions and individuals may encounter challenges related to the availability of robust technological infrastructure and resources required to effectively leverage open and digital tools. Insufficient technological resources, including hardware, software, and high-speed internet connectivity, can impede the seamless integration and use of digital tools in research workflows.

Digital Literacy and Skill Gaps: The effective use of open and digital tools for research necessitates a certain level of digital literacy and technical proficiency. Skill gaps and a lack of training opportunities may hinder researchers' ability to fully leverage the functionalities of digital tools, thereby limiting their capacity to conduct comprehensive research, data analysis, and knowledge dissemination using these platforms.

Quality and Reliability of Online Information: Assessing the quality and reliability of online information and data sources remains a significant challenge in the digital research environment. Researchers must critically evaluate the credibility and authenticity of online content to ensure the integrity and validity of their research findings, mainly when relying on open-access repositories and digital databases for scholarly information.

Interoperability and Integration Issues: Integrating diverse open and digital tools into a cohesive research workflow can be challenging, mainly when these tools operate on different platforms or have limited interoperability. Ensuring seamless data integration, compatibility, and transfer between digital tools and platforms remains a persistent challenge in the research community.

Addressing these challenges requires concerted efforts from stakeholders, including researchers, institutions, policymakers, and technology providers, to develop comprehensive strategies that promote data security, enhance digital literacy, bridge the digital divide, and foster a more inclusive and accessible research environment.

ADDRESSING CHALLENGES ASSOCIATED WITH OPEN AND DIGITAL TOOLS IN RESEARCH

Data Privacy and Security Concerns

Data privacy and security are paramount when using open and digital tools in research. Researchers must navigate complex ethical and legal frameworks to protect sensitive data and safeguard the privacy rights of research participants (Gallab, Nardo, & Naciri, 2024). Challenges may arise from issues such as data breaches, unauthorised access, and potential misuse of personal information, highlighting the need for robust data protection measures, informed consent protocols, and compliance with relevant regulations, such as the General Data Protection Regulation (GDPR) and the Health Insurance Portability and Accountability Act (HIPAA).

Digital Divide and Accessibility Barriers

The digital divide refers to disparities in access to digital technologies and internet connectivity, exacerbating inequalities in research participation and access to research resources. Researchers must address accessibility barriers to ensure that all individuals, including those from underserved communities and marginalised groups, have equitable access to open and digital tools. Strategies may include providing alternative formats for digital materials, improving internet infrastructure in underserved areas, and offering training and support to enhance digital literacy skills among research participants.

Reliability and Quality Assurance of Digital Tools

Ensuring the reliability and quality of digital tools poses significant challenges for researchers, particularly in rapidly evolving fields where new tools and technologies emerge frequently. Researchers must critically evaluate digital tools' validity, accuracy, and reliability before incorporating them into research workflows. This involves conducting thorough assessments of tool functionality, performance, and usability and verifying the integrity of data outputs and results. Additionally, researchers should prioritise transparency and reproducibility in developing and using digital tools, providing documentation, validation data, and peer-reviewed evaluations to support their adoption and use in research.

Ethical Considerations in Digital Research

Ethical considerations are central in digital research, requiring researchers to navigate complex ethical dilemmas related to informed consent, privacy rights, and data ownership. Researchers must uphold moral principles and standards throughout the research process, including data collection, analysis, and dissemination, to ensure the protection of research participants and the integrity of research outcomes. This may involve obtaining informed consent from participants, anonymising data to protect privacy, and adhering to ethical guidelines and codes of conduct established by professional organisations and regulatory bodies.

Digital Literacy and Training Needs

Digital literacy and training are essential prerequisites for effective utilisation of open and digital tools in research. Researchers must possess the necessary skills and competencies to navigate digital platforms, analyse data, and interpret research findings accurately. However, disparities in digital literacy levels and access to training opportunities may pose barriers to adopting and using digital tools, particularly among researchers from under-resourced settings or disciplines. Addressing these challenges requires investment in digital literacy programs, professional development initiatives, and capacity-building efforts to empower researchers with the skills and knowledge needed to leverage digital tools effectively in their research endeavours.

Sustainability and Long-Term Maintenance

Sustainability and long-term maintenance pose significant challenges for open and digital tools, as many projects rely on external funding and face uncertainties regarding ongoing support and maintenance. Researchers must consider digital tools' long-term viability and sustainability, including funding sources, community engagement, and governance structures. Strategies for addressing sustainability challenges may include diversifying funding streams, establishing partnerships with academic institutions or industry stakeholders, and fostering community-driven governance models to ensure digital tools' continued development and maintenance beyond initial project phases.

CONCLUSION

In conclusion, using open and digital tools in research presents tremendous opportunities and significant challenges for researchers across disciplines. While these tools offer unprecedented access to resources, facilitate collaboration, and enhance research transparency and reproducibility, they raise concerns about data privacy, accessibility, reliability, ethical considerations, digital literacy, and sustainability. Addressing these challenges requires a concerted effort from researchers, policymakers, funding agencies, and other stakeholders to develop robust ethical frameworks, promote digital literacy and accessibility, ensure the reliability and quality of digital tools, and support sustainable funding and maintenance models (Mhlongo, Mbatha, Ramatsetse, & Dlamini, 2023).

Despite these challenges, the transformative potential of open and digital tools in research cannot be understated. By embracing innovation, fostering collaboration, and prioritising inclusivity and equity, researchers can harness the power of these tools to advance knowledge, address pressing societal challenges, and promote positive social change (Crouzier, 2016). Moving forward, the research community needs to continue critically evaluating and refining open and digital tools while remaining vigilant in addressing ethical, legal, and social implications. Through collective action and commitment to responsible research practices, we can leverage open and digital tools to build a more equitable, transparent, and impactful research ecosystem that benefits society.

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CHAPTER TEN

Perception of SWAYAM-MOOCs Among Higher Education Faculty in Nagaland State

Rajendra Nath Babu Murathoti and Aosangla

ABSTRACT

The impact of technology on education has drastically changed the scenario of the whole education system. The present investigation is aimed at the perception of SWAYAM-MOOCs among higher education faculty members in Nagaland state concerning gender and type of management. A descriptive survey research design was adopted, and 208 faculty members (81 males and 127 females) working in Nagaland state higher educational institutions were randomly selected. The researchers developed the self-made standardised tool. Findings revealed that the respondents' motivation behind taking up SWAYAM-MOOCs largely depended upon professional development. The respondents have different perceptions of SWAYAM-MOOCs. Also, the study showed no significant difference in the mean perception scores in SWAYAM-MOOCs among the male and female higher education faculty members in Nagaland. In contrast, it was found that there is a significant difference in the perception of SWAYAM-MOOCs among higher education faculty in Nagaland regarding the type of management.

Keywords: Perception, SWAYAM, MOOCs, Higher Education Faculty, Gender, Type of Management.

INTRODUCTION

The teacher's motivation, drive and willingness to adopt technology in the best possible manner becomes the most prominent part of the learning process to use technology in the best possible

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manner therefore, it is crucial to understand the teachers' behaviour, which influences their perception of the acceptance and the adoption of technology for the curriculum and learning. On that account, studying the factors that initiate the teachers to adopt these changes, their awareness and attitude towards ICT in education, to find out their objective and concept on the effectiveness of ICT in education with regard to teaching learning becomes a thought-provoking topic to be discussed (Sharma & Srivastava, 2019).

With the rapid advancement in science and technology, there has been a significant influence on the present education system. The ideas, aims, attitudes, perceptions, and methods in education have drastically changed with the impact of science-based technology. Education is the only tool that can help humanity to keep on track with this advancement in knowledge and with emphasis on the five pillars of NEP 2020: Affordability, Accessibility, Quality, Equity and Accountability to ensure continuity in learning for every citizen irrespective of any barriers the role of SWAYAM MOOC plays a vital role. SWAYAM MOOC is an open online platform. It is a program initiated by the Government of India and designed to achieve the three cardinal principles of Education Policy: access, equity and quality. This effort aims to take the best teaching-learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have yet to be able to join the mainstream of the knowledge economy. Higher education is significant in promoting human and social well-being and developing India as envisaged in its constitution. Higher education largely contributes to sustainable livelihoods and the nation's economic development. Therefore, the most essential factor in a higher institution's success is its faculty's quality and engagement (NEP 2020, part II).

MOOC enrolment in India gradually escalates, with increased demands for online and distance education, highly favoured among Indian students and passionate learners. It extends unparalleled processes and methods that facilitate educators to extend learning among learners, covering even the inaccessible areas of the country to educate the masses with the thirst to learn.

With the emerging trends in technology, 21st-century teachers are expected to acquire teaching skills and content mastery and integrate teaching with technology. To keep pace with the changing world, the central role expected from a teacher is to keep oneself up to date with the latest trends to empower students to engage with the challenges. For a competent teacher, as per the recommendations of NEP 2020, it is significant that the teacher attains Continuing Professional Development to engage in different professional activities to develop and enhance one's abilities and skills in relation to their profession. Thus, the role of SWAYAM MOOC in professional development and career progress is emphasised.

REVIEW OF RELATED LITERATURE

Majumder's (2019) findings of the study suggest that if adequate digital devices are provided in all educational institutions, it will be highly beneficial for learners with quality teaching from the best universities; MOOCs are found to be the best platform to solve distance learning through SWAYAM in India. It further suggested a study on the observation of learners in adopting this

platform. Sivakumar (2019) revealed that there exists a lack of awareness and understanding of MOOCs-SWAYAM among student-teachers and suggested an urgent need to create awareness of the programmes provided through the MOOCs platform and emphasise the role of educational institutions to provide sufficient facilities to integrate MOOCs. Uppal (2019) discovered the perception and knowledge of Digital Fluency and the benefits of MOOCs in training higher education. It was found through the study that MOOCs can be an efficient tool in teaching higher education teachers, and high digital articulacy was also observed. Andimuthu and Ahamed (2020) found that learners are familiar with the platform and its courses and have acquired maximum benefits from the courses. Maximum learners completed the registered courses, with only a smaller number of learners dropping the course.

Kundu and Bej (2020) found the impact of MOOCs on private university learners and educators in India. It was found that the programme had met the goals of providing scope for educators and learners to acquire new skills. Still, engagement and registration in the programme turned out to be deficient owing to the absence of information related to the programme and insufficient support of materials required. Karthika's (2020) findings revealed that many college students have moderate MOOC awareness, self-learning strategies and Interest towards Mobile Technology. The study also highlighted that MOOC is one of the unique ways of cost-effectively providing higher education to lower- and middle-class students, and it is technologically enhanced learning. Kamble and Chavan's (2020) findings of the study present that the SWAYAM platform, despite the vast obstacles faced hence it is dominantly playing a paramount role in enhancing the academic achievement of employed learners; the study further suggested the requirement for boosting the SWAYAM portal for smooth functioning and delivery in mobile applications. Ambadkar's (2020) findings of the survey represented a low level of awareness but a positive attitude towards learning through SWAYAM among the students; it also revealed that the low utilisation of the MOOC platform was due to a lack of ICT skills among the students. Kumar and Mahendraprabu (2021) found that there are high-level practices and utilisation of the SWAYAM programme among research scholars in state universities of Tamil Nadu. The study further suggested awareness programmes for college and university students on SWAYAM courses. Pathak & Mishra's (2021) study revealed that the contentment of the learners was dependent on factors such as learners' goals, behaviour and perceived course usability and was less influenced by gender, age, and previous knowledge of the learner. Goel et al. (2023) found that professional development, personal development, and peer influence were some major factors behind the motivation of MOOC instructors. Also, studies presented those internal and external factors that influenced the instructors to develop MOOCs. Singh's (2022) findings suggest that many factors can still be improved to raise the quality of teachers' professional development, such as improvement in designs, delivery, and assessment. Vijila and Thiyagu (2022) found that the awareness, readiness, and perception of postgraduate students of Kerala have a significant relation to engagement in MOOCs. Liu's (2021) findings revealed that learners found e-learning through cloud meetings more convenient and helpful than MOOCs; live learning and interaction between the teacher and learners were more beneficial for the learners. Shao & Chen's (2021) findings revealed that the perceived interactivity attributes play a vital role in motivating individuals to

participate and that males and females differ in their reactions to those perceived interactivity attributes.

Despite its challenges, studies conducted regarding SWAYAM MOOC show its positive aspects and effectiveness. Though much research has been done regarding MOOCs and the SWAYAM MOOC platform, since the SWAYAM MOOC platform is a recently introduced programme initiated by the government of India, only a few studies have been done on this research area in Nagaland. Thus, in the present study, the researcher will look into the dependent variable—SWAYAM MOOC—and analyse the independent variable—perceptions of SWAYAM MOOCs among higher education faculty in Nagaland.

OBJECTIVES OF THE STUDY

The present study is designed to attain the following objectives:

- 1) To identify the motivation behind taking up SWAYAM-MOOCs among Higher Education Faculty
- 2) To determine the level of Perception of SWAYAM-MOOCs among higher education faculty.
- 3) To find out the Perception of SWAYAM-MOOCs among Higher Education Faculty in Nagaland with respect to Gender and Management.

RESEARCH QUESTIONS OF THE STUDY

- 1) Does any higher education faculty have completed MOOCs (ARPITs) on the SWAYAM platform?
- 2) What is the motivation behind taking up SWAYAM-MOOCs for the Higher Education Faculty?

HYPOTHESES OF THE STUDY

The following hypotheses were formulated as per the stated objectives of the present study:

- 1) Higher Education Faculty in Nagaland have similar perception levels of SWAYAM-MOOCs.
- 2) There is no significant difference between male and female higher education faculty in Nagaland regarding their mean perception scores in SWAYAM-MOOCs.
- 3) The Government and Private Higher Education Faculty in Nagaland are similar in terms of their mean Perception scores in SWAYAM-MOOCs.

METHODOLOGY

Method: A descriptive survey research design was adopted to determine the Perception of SWAYAM-MOOCs among Higher Education Faculty Members. The authors employed a comparative research method to find significant differences in the Perception of SWAYAM-MOOCs among higher education faculty members based on their gender and management. The study was conducted in Nagaland State, covering all the higher education faculty members.

Sample: The researchers used stratified random sampling to select the study's sample population. The current study's sample consists of both government and private colleges in Nagaland. Five (5) government colleges and five (5) private colleges in Dimapur and Kohima districts represent the state. Thus, the total number of samples collected from all ten (10) institutes summed up to 208 higher education faculties.

Instruments: In this study, the researchers developed an instrument to assess faculty perceptions of SWAYAM-MOOCs among higher education institutions. The instrument comprises 54 items, each rated on a five-point Likert scale ranging from Strongly Disagree (SD) to Strongly Agree (SA). Respondents were directed to rate each statement based on their level of agreement, and the overall perception score is derived from the cumulative ratings across all items.

The items were standardised through item analysis, which contributed to the questionnaire's robustness. The scale's reliability was confirmed with a Cronbach's Alpha coefficient of 0.945, indicating excellent internal consistency. Furthermore, the instrument exhibited high intrinsic validity, with a validity coefficient of 0.972, for measuring the Perception of SWAYAM-MOOCs among higher education faculty in Nagaland. This level of reliability and validity underscores the tool's efficacy in capturing accurate and meaningful insights into academic staff's perceptions of SWAYAM-MOOCs.

Data Analysis: Both descriptive and differential statistics were employed for data analysis. The authors used frequency, percentile, and mean as descriptive statistics to understand the Perception of SWAYAM-MOOCs among higher education faculty in Nagaland State. They also performed an independent sample t-test as differential statistics to examine the significant mean difference in their Perception of SWAYAM-MOOCs scores based on gender and management.

RESULTS

Objective 1: To identify the motivation behind taking up SWAYAM-MOOCs among Higher Education Faculty

Research Question 1: Is there any Higher Education Faculty completed MOOCs (ARPITs) on the SWAYAM platform?

Table 1: Frequency and Percentage Distribution on Completion of any MOOCs (ARPIT) on the SWAYAM Platform.

Have you completed any MOOC's (ARPIT) on the SWAYAM platform?	Frequency	Percentage
Yes	40	19.2 %
No	168	80.8 %
Total	208	100 %

Source: Author's Compiled from the field study, 2022-2023

Table 1 presents data acquired from respondents regarding the completion of MOOCs, specifically ARPIT, on the SWAYAM platform. The responses are divided into "Yes" or "No" and are further represented through frequency and percentage distribution. According to the data, out of 208 respondents, 40 (19.2%) indicated that they have completed ARPIT MOOCs on the SWAYAM platform, while 168 (80.8%) reported that they had not completed any ARPIT MOOCs.

This distribution highlights that most respondents have yet to engage with ARPIT MOOCs on the SWAYAM platform. The findings underscore the potential need for further investigation into the factors influencing the low completion rates of these courses among the surveyed group.

Research Question 2: What is the motivation behind taking up SWAYAM-MOOCs by the Higher Education Faculty?

Table 2: Frequency and Percentage Distribution of Motivation for Taking up SWAYAM-MOOC.

Statement	Yes	Percentage	No	Percentage
Empower knowledge and skills	35	16.8 %	173	83.2 %
For certificate purposes	30	14.4 %	178	85.6 %
Time restraint to pursue a formal education	14	6.7 %	194	93.3 %
Extending current knowledge of the topic	23	11.1 %	185	88.9 %
General interest in the topic/course	24	11.5 %	184	88.5 %
Explore the interest area from the course provided	14	6.7 %	194	93.3 %
Professional development	38	18.3 %	170	81.7 %
For CAS promotion	11	5.3 %	197	94.7 %
Any other (please specify)	1	0.5 %	207	99.5 %

Source: Author's Compiled from the field study, 2022-2023

Table 2 illustrates the frequency and percentage distribution of motivations for enrolling in SWAYAM-MOOCs among respondents:

- 35 (16.8%) respondents enrolled in SWAYAM-MOOCs to enhance their knowledge and skills, while 173 (83.2%) did not align with this motivation.

- 30 (14.4%) pursued SWAYAM-MOOCs for certification purposes, whereas 178 (85.6%) reported different motivations.
- 14 (6.7%) engaged in SWAYAM-MOOCs due to time constraints that prevent pursuing formal education, with 194 (93.3%) citing other reasons.
- 23 (11.1%) participated to extend their current knowledge on a topic, while 185 (88.9%) did not share this motivation.
- 24 (11.5%) joined SWAYAM-MOOCs out of general interest in the topic or course, with 184 (88.5%) having different motivations.
- 16 (7.7%) enrolled to explore an area of interest offered by the course, while 192 (92.3%) had other motivations.
- 38 (18.3%) took SWAYAM-MOOCs for professional development, with 170 (81.7%) indicating alternative motivations.
- 11 (5.3%) enrolled for Career Advancement Scheme (CAS) promotion, and 197 (94.7%) did not align with this motivation.
- 1 (0.5%) respondent took up SWAYAM-MOOCs for unspecified reasons, while 207 (99.5%) cited different motivations.

Tables 1 and 2 present the distribution of completion rates and motivations for taking SWAYAM-MOOCs among faculty from higher education institutions in Nagaland. The researchers analysed nine statements to determine the motivational factors influencing the uptake of SWAYAM-MOOCs. From the analysis, professional development was the predominant motivator for engaging with SWAYAM-MOOCs.

Objective 2: To determine the level of Perception of SWAYAM-MOOCs among higher education faculty.

Hypothesis 1: Higher Education Faculty in Nagaland do not have the different levels of Perception of SWAYAM-MOOCs.

Table 3: Level of Perception of SWAYAM-MOOCs Scores.

Score	Frequency	Percentage	Level	Chi-Square Value
162 & Below 198	03	1.44%	Below Average	95.2
Between 162 and 198	103	49.52%	Average	
199 and above	102	49.04%	Above Average	
N	208	100%		

Source: Author's Compiled from the field study, 2022-2023

Table 3 represents the frequency distribution of Higher Education Faculty in Nagaland who do not have different levels of Perception of SWAYAM-MOOCs. The overall data were analysed in the form of percentages to find out the level of Perception of SWAYAM-MOOC's

Higher Education Faculty in Nagaland, where Analysis of Table 3 reveals that 1.44% scored Below Average Level of Perception of SWAYAM-MOOC, 49.52% scored Average Level and 49.04% scored above Average Level of Perception of SWAYAM-MOOC's. The calculated chi-square value is 95.2, and the table chi-square value for 2df at 0.01 level of significance is 9.21. The calculated chi-square value is greater than the tabulated chi-square value. Therefore, the hypothesis "Higher Education Faculty in Nagaland do not have the different levels of Perception of SWAYAM-MOOC" is rejected. It shows that Higher Education Faculty in Nagaland varied in their level of Perception of SWAYAM-MOOC's scores. Thus, we can conclude that the Higher Education Faculty in Nagaland have different levels of Perception of SWAYAM-MOOCs.

Objective 3: To find out the Perception of SWAYAM-MOOCs among Higher Education Faculty in Nagaland with respect to Gender and Management.

Hypothesis 2: There is no significant difference between Male and Female Higher Education Faculty in Nagaland in their mean Perception scores in SWAYAM-MOOCs.

Table 4: Mean, SD and t-values of Perception scores in SWAYAM-MOOCs among Higher Education Faculty in Nagaland with respect to Gender.

Gender	N	Mean	S.D	t-value
Male	81	200.54	21.665	0.193
Female	127	195.01	19.096	
N	208			

Not Significant at 0.05 level

The scores obtained from the Higher Education faculty of Nagaland in the SWAYAM-MOOC's Perception scale were analysed by calculating Mean, Standard Deviation, Standard Error Mean and t-value. An analysis of Table 4 shows the Mean and standard deviation values of the respondents' gender are 200.54, 21.665 male and 195.01, and 19.096 female, respectively. The overall calculated t-value for the perception of SWAYAM-MOOC with respect to gender (0.193) is lower than the critical t-value (1.96) for 1 and 206 df at 0.05 level of significance. Hence, "there is no significant difference between Male and Female Higher Education Faculty in Nagaland in their mean Perception scores in SWAYAM-MOOC" is accepted.

Therefore, the mean perception scores of male and female higher education faculty in Nagaland regarding SWAYAM-MOOCs are not significantly different.

Hypothesis 3: No significant difference exists between the government and private higher education faculty in Nagaland regarding their mean perception scores in SWAYAM-MOOCs.

Table 5: Mean, SD and t-values of Perception scores in SWAYAM-MOOCs among Higher Education Faculty in Nagaland with respect to Management.

Management	N	Mean	S.D	t-value
Government	95	207.02	18.610	7.174*
Private	113	188.88	17.795	
N	208			

* Significant at 0.05 level

The perception scores of higher education faculty from Nagaland on the SWAYAM-MOOCs scale were statistically analysed using mean, standard deviation, standard error of the mean, and t-value. According to the data presented in Table 5, the mean and standard deviation for the perception scores of government faculty are 207.02 and 18.610, respectively, while for private faculty, these values are 188.88 and 17.795, respectively.

The calculated t-value for comparing the perception scores between government and private higher education faculty with respect to their management of SWAYAM-MOOCs is 7.174, which exceeds the critical t-value of 1.96 for 207 degrees of freedom (df) at a 0.05 level of significance. This result leads to the rejection of the null hypothesis that states, "There is no significant difference between government and private higher education faculty in Nagaland in their mean perception scores of SWAYAM-MOOCs."

Consequently, the analysis confirms a significant difference in the mean perception scores between government and private higher education faculty in Nagaland regarding SWAYAM-MOOCs.

FINDINGS

After conducting the analysis and interpretation of the data, the following findings have been drawn from the present study in relation to the study's objectives. The findings of the present study derived from the analysis of the data are as follows:

- Out of a total of 208 respondents, 40 (19.2 %) of the respondents have completed MOOCs (ARPITs) on the SWAYAM platform, and 168 (80.8 %) did not complete any MOOCs (ARPITs) on the SWAYAM platform.
- It was found that the respondents' motivation behind taking up SWAYAM-MOOCs largely depended upon Professional Development.
- 1.44% scored Below Average Level of Perception of SWAYAM-MOOCs, 49.52% scored Average Level, and 49.04% scored above Average Level of Perception of SWAYAM-MOOC
- The Higher Education Faculty in Nagaland has different levels of perception of SWAYAM-MOOCs.
- The study revealed that there is no significant difference between Male and female higher education faculty in Nagaland in their mean Perception scores in SWAYAM-MOOCs.
- It was found that there is a significant difference in the perception of SWAYAM-MOOCs among higher education faculty in Nagaland regarding Government and Private faculty under the type of management.

EDUCATIONAL IMPLICATIONS

The present study should benefit the educational sector by raising awareness and perceptions of SWAYAM MOOCs and bringing about the necessary positive change to imbibe among teachers the opportunities behind acquiring and completing courses from the SWAYAM platform.

- 1) SWAYAM-MOOCs, as an e-learning platform developed on the firm adherence of the five pillars NEP 2020 – Access, Equity, Quality, Affordability, and Accountability have become an indispensable part of the present system of education and concerning that the findings of the study in Nagaland with regard to Higher Education Faculty about the motivation behind taking up SWAYAM-MOOC's were found to have a very positive turn out as the majority of the faculties motivation behind the enrolment was on Professional development which is essential for producing quality Teachers and the overall impact the education system, as well it highlights that out of 208 respondents, 168 (80.8%) failed to fit under the completion of any MOOC's (ARPIT) on SWAYAM platform for which several initiatives can be taken to motivate the higher education faculty's to take up some courses as per one's interest that will empower their knowledge and skills resulting to producing competent enabled teachers for quality education.
- 2) With the impact of technology on education, most faculties rely on ICT tools for learning and delivering content to the students, which is a need of the hour. Through this study, special attention is drawn to the awareness and usage of e-learning platforms among higher education faculty in Nagaland that will direct different educational organisations on the status of teachers' understanding about different educational platforms and take up considerable initiatives like improve internet connectivity, make the exam pattern more flexible to accommodate each learner, to ensure employability, to allocate exam centre's within one's district which will increase the enrolment of learners, organise a programme to enhance ICT skills among teachers, availability of courses in different regional languages, that can help provide teachers ample opportunities to enhance learning through the use of e-learning platforms.
- 3) The findings suggest that among higher education faculty in Nagaland, 1.44% have an Average level of perception of SWAYAM-MOOCs, 49.52% have an Average level of perception of SWAYAM-MOOCs and 49.04% have above Average level of perception of SWAYAM-MOOC's, which brings out to conclude that with persistent effort provided through means of different awareness programmes, seminars on the opportunities that are provided through SWAYAM platform for teachers to enhance their knowledge, keep oneself up-to-date, improvise their content knowledge, upgrade their academic credits if this awareness is imparted immense changes could be bought in the educational system of the state through well-equipped teachers.

- 4) From the study, it was highlighted that there was a difference in the mean perception score between Government higher education faculty and Private higher education faculty, where Government higher education faculty obtained Mean and Standard Deviation of 207.2 and 18.610, respectively, more than the Private higher education faculty with Mean and Standard Deviation 188.88 and 17.795, which is attributed to Government higher education faculty with better opportunities, resources and exposures, therefore to solve this differences proper channels can collaborate to create awareness and make use of the voices of those who have already completed courses from the SWAYAM-MOOC's platform about the experiences and the benefits acquired from the platform which will act as impulsive factor in promoting the platform among higher education teachers as well every learners as a whole.

Thus, the study provides insight into the perception of SWAYAM-MOOCs among higher education faculty in Nagaland, which will guide educational organisations in formulating various steps to meet the goals for quality education as implemented in the current Educational Policy of NEP 2020.

CONCLUSION

Findings revealed that the respondents' motivation behind taking up SWAYAM-MOOCs largely depends upon Professional Development. The respondents have different perceptions of SWAYAM-MOOCs. Also, the study showed no significant difference in the mean Perception scores in SWAYAM-MOOCs among the male and female higher education faculty members in Nagaland. In contrast, it was found that there is a significant difference in the perception of SWAYAM-MOOCs among higher education faculty in Nagaland regarding the type of management. The impact of technology on education has drastically changed the scenario of the whole education system. The effect, if taken positively, has unending reasons. The transmission of education, making education accessible to all and affordable to every learner irrespective of various barriers that hinder one from acquiring quality education, is made feasible. To be precise technology has made transmission and acquisition of knowledge extremely accessible that every student, teachers- learners as a whole can obtain knowledge anytime, anywhere for different purposes to upgrade one's learning, understanding, keep track of one's own learning, empower skills, explore one's area of interest of any courses provided, for professional and self-development, to improve one's academic credits etc. therefore comprehensive awareness and knowledge on technology integrated learning is emphasized specially as a higher education teacher for professional and self-development, to enhance and develop one's teaching methods by upgrading oneself time to time through various sources available as it is well accepted worldwide that education its system, techniques, goals keeps changing with time, demands and needs of the society and therefore here the role of teacher in keeping oneself up to-date is the need of the hour in order to keep track of oneself with the changes as well in maintaining the quality of education with emphasis on the needs and requirements of the learners and for these the government, various educational organizations and NGO's with the assistance of experts and professionals can take initiatives in organizing seminars, orientation, training programmes,

awareness programmes for teachers on the recent trends in education so as to produce quality teachers that will help in building a harmonious society and nation as a whole.

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CHAPTER ELEVEN

DIGITAL EDUCATION: PROSPECTS AND CHALLENGES

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ABSTRACT

Digital education is a recent creation, though it has existed in a few other forms. Now, it has become part of the educational system that has been digitalised. This paper aims to analyse the potential and challenges of digital education and its relation to implementing extensive online open courses in the changing scenario. We have seen a significant change in academic collaboration and communication since the advent of Internet technologies. The digital revolution facilitated global, unfettered access to information. With the abundance of ICT tools available in today's classrooms, nearly all educators have made great strides in incorporating digital technology to enhance students' access to knowledge and chances for cooperative learning. Considering the digital transformation and disruptive technology advancements, the higher education system must use ICT to stay competitive and offer top-notch instruction. To achieve these goals, this paper outlines the technological resources and approaches higher education has utilised in the current environment to implement digital transformation. The paper also aims to synthesise considerable insights that can be applied to the digitalisation of higher education in the current and near future.

Keywords- Digital Education, Higher Education, Teaching and Learning, Technology.

INTRODUCTION

Recent inclinations towards modernisation in society and technology have resulted in several notable alterations to educational institutions. Adopting new technologies has resulted in a fundamental shift in how technology is viewed as a dynamic and interconnected environment promoting digital learning (Alenezi, 2020). Higher education institutions attracting a more extensive and diverse student body must embrace digitalisation. It also makes monitoring easier to identify training obstacles and reduce school dropout rates (Romanova, 2020). However, there

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remains opposition to realising and using this opportunity to move toward the digital world.

The increasing utilisation of digital learning tools is propelling education towards unprecedented frontiers. Higher education institutions need to adapt their educational technology solutions to meet the needs of their students, while teachers need to reconsider what it means to deliver a learning experience (Kundi, 2014). In many aspects, digital learning is considerably better for teachers and students than the traditional classroom model. It is possible to use any time and place convenient for everyone to learn and teach. Of course, there are drawbacks to digital learning in addition to its advantages. Given the number of tools and digital technology students must know and use, many students who function well in a traditional context may need help to succeed online. Students may experience increased pressure during the educational process as a result of the new platform for education digitisation (Nurhas, 2022).

OBJECTIVE OF THE STUDY

This study explores the definition of digital education and its application to higher education. It also draws attention to the difficulties and chances associated with incorporating digital learning into institutions of higher learning.

RESEARCH METHODOLOGY

This study uses secondary data, which is descriptive in nature. The data has been gathered from various sources, including newspapers, periodicals, websites, and more.

DIGITAL EDUCATION

Digital education is creatively using digital tools and technologies in the classroom. Teachers can use digital technology to offer engaging learning possibilities. Teachers and students will both gain from this creative application of digital technology. By experimenting with new strategies, educators find more effective and sophisticated ways to instruct students. This promotes involvement and makes learning fun (Toyo, 2017).

Digital technology plays a significant role in the academic concept of teaching and learning. Innovations in technology like computers, smartphones and the internet have profoundly affected people's lives and organisations. On an organisational and managerial level, higher education institutions offer computerised capabilities that support virtual organisation, instruction, and learning oversight. Additionally, the use of digital tools in education and at the corporate level has increased dramatically, raising expectations that education will change the impact of how students connect and receive instruction. There have been changes to the roles that professors and students play. These changes to higher education include that knowledge constructed through lectures and educational materials is easily accessible (Cheon, 2012).

The changes in teaching and learning in higher education brought about by integrating digital technology are centred on a continually changing and diversified range of resources (Hatlevik, 2013). Because they support students in their daily social interactions and have the potential to

promote more shared learning processes and student autonomy in learning. Web tools and other online equipment like social media tools have revolutionised education. The amount of time teachers and students spend together is becoming increasingly more flexible, taking place outside of the classroom through relationships, communication, involvement and content sharing (Kundi, 2014). These days, hybrid learning environments include digital, mixed and in-person instruction. Due to the shift in "time for learning" brought about by digital technologies and learning settings, education is now "all the time" (Sleeman, 2016).

EDUCATION, TEACHING AND TECHNOLOGY

Despite the long history of using online teaching and learning, the outcomes still need improvement. Because of their unusual teaching methods, some instructors have refused to employ online teaching tools (Koryuhina, 2018). Thus, one of the biggest obstacles is getting teachers to change their teaching philosophies or approaches.

On the other hand, some students need to be used to utilising online learning platforms for academic reasons. The biggest obstacles to student participation in online education are passion and presence, although technology and interpersonal skills are essential for enhancing retention and pleasure (Humpl, 2022). Training strategies include exercises, video lectures, self-assessment tasks and scenarios related to practice for integrating theory and for teachers to enhance their students' virtual learning experience. Higher education institutions must alter their teaching strategies using blended learning and knowledge acquisition through constructivist learning environments and virtual technology (Miranda, 2015). Students must be present in person to properly apply these strategies. The primary problem is that, despite the many instructional tactics proposed to enhance students' learning, students do not participate. How eagerly students use such web-based learning will eventually determine how effective the learning pedagogies are.

Motivation and involvement are essential for web-based learning, but the situations are now different. All participants—teachers and students in particular—must participate in online teaching and learning. Teachers must adapt to these applications regardless of their technical restrictions, involvement level, or teaching approaches. Information technology (IT) departments have provided institutions with infrastructures, technology transfer and online instructional tools to promote real-time instruction and facilitate online learning. Pupils' readiness for a live and virtual learning environment is still unknown because they can obtain life lessons from anywhere, which makes it hard for teachers to oversee or supervise. Students' readiness for live digital learning is one of the requirements for an effective learning process and academic success (Ramel, 2020).

However, in contrast to traditional in-person instruction, distance learning does not guarantee student attendance, which makes it difficult to gauge the degree of attentiveness among students (Widjaja, 2017). Both the efficiency of live online learning and the student's capacity to participate in class are highly impacted by their level of preparation for it. Learners' readiness for online learning is determined by several factors (Walia, 2019).

THE ROLE OF ICT

"Information and communication technology" (ICT) refers to various technological developments that manage and transport digital data. All modern computerised development professions are seen as beneficial by information and communication technology professionals, individuals and enterprises alike. Representing information communication technology can take time due to the rapid pace of change in the field. ICT concerns include sending, managing, retrieving and restricting computerised information. It can be defined as processing and communication organisations that prioritise characteristics that support teaching, learning and student exercise in various ways (Koryuhina, 2018). The swift growth of social media platforms and the advancement of contemporary technology have significantly transformed how education is carried out. The future of education and society at large now depends on all stakeholders in the educational system being able to understand the strategic vision of education, where ICT plays a vital strategic role.

According to UNESCO, ICT permeates the educational environment and assists the 21st century's education system. ICT is useful for organising, improving, and managing learning in educational settings. Technologies are a significant driver of innovation and growth in industrialised and developing nations. As a result, all countries must strive to use technical innovations. Regardless of specific computer systems or software frameworks, professionals, including academics, must possess strong ICT credentials to meet the demands of a continuously shifting global environment (Suleiman, 2020).

DIGITAL EDUCATION TYPES

From a technological and scientific perspective, the important thing is how well online learning works at institutions. The availability of accessible learning resources that are not reliant on location or time defines the nature of learning in digital educational facilities. Digital learning environments also provide technology-enhanced education and open up educational opportunities for all students. Scholars from various disciplines have been trying to identify the components of successful digital learning in higher education since about 20 years ago. Two primary objectives of higher education are facilitating students' ability to achieve exceptional results and supporting them in using their knowledge to tackle future challenges. Studies on using e-learning environments in higher education need to focus on academic achievement to evaluate learning success (Mothibi, 2015). To make students competent and skilled members of a knowledge-based society, digital content must be available for use in learning, transmission, cooperation and engagement. Second, by facilitating mobile and ubiquitous learning or increasing students' willingness to adapt to prior information, digital learning environments promise to enhance the efficacy of teaching and learning (Greenhow, 2022).

The advent of modern internet users and their exposure to artificial intelligence (AI) have led to a revolutionary and ever-changing landscape in digital education. Thanks to modern technologies, we can customise the learning process to fit our unique needs and schedules (Danmuchikwali, 2020).

Over the past ten years, blended learning has increased in the educational landscape. Blended learning can circumvent some issues facing in-person and virtual training (Alammery, 2014). A meta-analysis of over 1100 empirical research published between 1996 and 2008 found that blended learning is more successful than online or in-person training. While a plethora of blended learning approaches have been proposed and extensively debated in scholarly literature, relatively little research has attempted to classify and evaluate different design approaches to ascertain the benefits and challenges associated with each (Hrastinski, 2019).

A learning approach called personalised learning is customised to meet the needs of each student along a unique learning path. Personalised learning, or personalisation, refers to a broad range of educational programmes, learning experiences, instructional methodologies and academic support measures. They are focused on each student's unique learning needs, interests, goals, or cultural backgrounds. Personalised learning aims to adjust training to each learner's needs, interests, and strengths. Each student receives a customised study plan based on their learning style and existing knowledge (Watters, 2023).

Software that incorporates several tools and programmes to enable online collaboration, student assessment and feedback, academic content uploading, and course organisation is known as a Virtual Learning Environment (VLE). Virtual learning environments are one of the most crucial instruments for developing pedagogical and instructional practices that may change to accommodate the evolving needs of education and pedagogical approaches. In the last ten years, a significant effort has been made to support teaching and learning in higher education through virtual classrooms. There has been little interaction between students and virtual classrooms and institutional integration. The goals are to maintain, accomplish, enhance and improve learning assessment of education (Liu, 2018).

CHALLENGES OF DIGITAL EDUCATION

The usage of this infrastructure has the following limits that could potentially pose obstacles to the success of any online courses:

1. Digital literacy: To use the internet effectively, teachers and students must fully understand computers. Digital literacy is the capacity to use technology to get information, assess sources, create content and interact with others. It is a collection of abilities needed to function in the modern technological paradigm of society. Proficiency in digital literacy is crucial for efficient online learning (Alii, 2022). Students can only succeed in an online programme with these cutting-edge tools; they can stop the entire programme with the help of their teaching assistants or fellow students.

2. Lack of direct teacher-student interactions: It is easy to underestimate the quantity of on-campus instructor interaction students experience. This instructive section consists of actual question-and-answer sessions. Debate opportunities exist before and after classes, during office hours, and in random hallway encounters. However, these are not accessible in online learning (Vanrensborg, 2018).

3. Need for self-discipline: In higher education, many students struggle to keep their composure in a classroom situation. Their parents and teachers do not constantly supervise them for the rest of the time. Students who miss class or homework can still socialise (Ramel, 2020). Others require internal drive and time to concentrate on the current work. It is considerably easier to "skip class" or forget an assignment in an online school.

4. Technological obstacles: We would instead assume everyone has access to the newest models of laptops and desktop computers. Though they belong to a generation of "digital natives," not all kids have had the same internet access level. It has become commonplace for consumers to use their mobile devices for internet activities. Some people only have restricted access to the internet or Wi-Fi, even though all of their information comes from their phone plan (Danmuchikwali, 2020).

5. Meeting deadlines: Despite the connection to the self-control element, this topic is worthy of entry. One of the main benefits of this approach is that it allows students to learn at their speed. However, the benefits can also come with risks. The phrase "their own pace" eventually leads to "perfectionism and a mad scramble." Helping pupils maintain their pace before the deadline (Henderson, 2015).

6. Digital education is inappropriate for practical sessions: Even though e-learning offers practical knowledge and preparation, the learner needs to evaluate their performance or experience at the end of the course. The bulk of digital content providers opted to focus on theoretical knowledge development rather than the development of practical skills (Jokiaho, 2018). This makes sense because it is far easier to implement theoretical lectures than practical courses in an online learning environment. Putting practical tasks into an online course requires significantly more advanced planning than theoretical instruction because there is no workshop or in-person contact.

OPPORTUNITIES OF DIGITAL EDUCATION

Digital learning may be beneficial for both students and teachers. Following are the opportunities for digital learning:

1. Improving teaching and learning: Digital technologies will improve the educational perspective for all children and young adults. Most research on how digital education affects learning discovered that it enhances the importance of educational development and the evolution of high-tech abilities. The focus of education in the future will be on digital technologies, which will completely replace current educational approaches (Aresta, 2015).

2. Growing return on investment in higher education: Financial developments have aided the rise of new businesses and the loss of jobs, particularly in high-end industries. For this reason, innovation is crucial in a globalised and competitive workplace. The competitive character of the workplace makes these behaviours worse. Research and development have demonstrated the importance of innovations and entrepreneurial abilities in fostering job creation (Akour, 2022).

3. Increasing parental and school engagement: Positive research suggests that communicating with parents directly through digital tools and software would improve learning and increase student adherence to participation and conduct criteria set by teachers. For pupils who use technology, the K–12 educational system might be more relevant, engaging, and interactive (Alenezi, 2021).

4. Reducing inequality: Many high-poverty, rural, urban and marginalised pupils might benefit from improved learning opportunities if a curriculum rich in innovation was developed. These students might need access to these vital resources. Global interconnectedness and ICT expansion can accelerate educational development, close the digital divide, and create a knowledge-rich society in various domains. It is a compelling case to be made that students from diverse backgrounds can access and learn content, knowledge and information at any time by utilising ICT for digital education. Providing online access to creative curricula and rich content will gradually lessen the disparity in accessing the required knowledge (Gladkova, 2022).

5. Anywhere and anytime: The online classroom is open twenty-four hours daily. Another advantage of the online learning style is time availability. Online meeting systems facilitate communication, allowing students to participate in class activities while managing social, professional and academic obligations (Buzzard, 2011). Every day, students today use personal technology for learning, exploration, collaboration, communication and teamwork. They stay aware of their surroundings in a car, at home, on a train, or in the school hallways. Due to their extensive exposure to digital technology, students find it more straightforward to utilise it for many other aspects of their lives, such as reading and writing, to follow their favourite celebrities on Twitter and share their goals on social networking sites.

CONCLUSION

There is an immediate need to improve school education to better prepare pupils for the rapid growth of technology. These changes bring about numerous opportunities and obstacles for advancing digital education. In an era where a critical legal project redefines the institution's role in reshaping distance and digital learning, the educational system must aggressively defend its position as a leader in quality and innovation.

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CHAPTER TWELVE

PEDAGOGICAL INTERVENTIONS IN OPEN AND DIGITAL LEARNING

Reeta Dwivedi

ABSTRACT

This paper provides an overview of the different pedagogical interventions that can be implemented in open and digital learning settings. Pedagogical interventions in open and digital learning involve strategies, approaches, and techniques that educators and institutions use to enhance the effectiveness of teaching and learning in online and open education environments. Open and digital learning encompasses various contexts, from massive open online courses (MOOCs) to blended learning and online degree programs. These interventions aim to develop autonomous, critical thinking, and problem-solving skills among learners, integrating digital technologies. They focus on developing technical, digital, and soft skills like collaboration, creativity, and communication. These interventions use active learning strategies, project-based learning, online courses, and blended learning models. They can complement flipped teaching or participatory action research strategies in higher education settings. These pedagogical interventions can help educators adapt to the unique challenges and opportunities of open and digital learning, promoting student engagement, retention, and success in online education settings.

Keywords: Pedagogical interventions, Digital technologies, Learning strategies, Online courses.

INTRODUCTION

Integrating pedagogical interventions in open and digital learning becomes increasingly crucial as educational institutions navigate the digital transformation era. The shift towards open and digital learning environments necessitates re-examining pedagogical approaches to effectively support student learning, academic instruction, and institutional management. (Pedagogical

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Paradigms in Open and Distance Education - Springer, n.d.) In response to this shift, educators and researchers are exploring various pedagogical frameworks designed to support learning using digital technologies in online, open, and blended settings, aiming to facilitate active learning within the curriculum and evaluate the impact of curriculum interventions. (Open and Inclusive Educational Practice in the Digital World, n.d.)

Developing autonomous learning strategies within problem-solving contexts is paramount in the digital age. As education becomes increasingly reliant on online platforms, there is a need to address current trends in e-learning and provide more flexible and personalised e-learning systems to meet the diverse needs of learners. Central to the success of these interventions is the cultivation of digital competence among both students and teachers, alongside the establishment of clear guidelines for the skills, knowledge, and approaches required to thrive in the digital age (The Digital Transformation of Higher Education Teaching: Four, n.d.)

Educators and researchers are guided by standards, frameworks, models, and best practices when designing and implementing pedagogical interventions in open and digital learning to navigate the complexity introduced by integrating technology into pedagogy. However, challenges such as educator perceptions of the value of technology could hinder the adoption and creative deployment of digital technologies in teaching and learning practices. Consequently, educational institutions must align their infrastructures to support digital pedagogies and a future-focused curriculum emphasising learner agency, collaboration, risk-taking, and experimentation. (A Review of Literature on the Effective Pedagogy Strategies for Online, n.d.)

To pursue the prime aim of pedagogical interventions in open and digital learning, a careful balance must be struck between integrating new digital tools and applying relevant pedagogical practices. The following sections will delve into the various aspects of these interventions, addressing the latest developments, challenges, and potential impact on education in the digital era.

Incorporating pedagogical interventions in open and digital learning is crucial to addressing the evolving landscape of education and institutional management. (Bolotova et al., 2021) The successful integration of digital technologies in education relies on effectively empowering learners and educators, steering away from traditional, teacher-centred tasks toward fostering technology-enhanced, student-centred learning environments. To support this approach, it is vital to explore pedagogical frameworks that can provide a valuable scaffold for active learning within the curriculum and evaluate curriculum interventions (Nerantzi, 2020). To meet the diverse needs of learners, it is crucial to cultivate digital competence among students and teachers. Enhancing digital competence among students and teachers is imperative for successfully integrating digital technologies in education.

SIGNIFICANCE AND RELEVANCE

Pedagogical interventions in open and digital learning are crucial in ensuring effective and meaningful educational experiences for learners. These interventions help educators leverage the potential of digital technologies and tools to enhance teaching and learning processes. By focusing on open pedagogical approaches, learners are encouraged to develop autonomous learning strategies within problem-solving contexts (LeBlanc, 2019). This approach allows learners to take ownership of their learning and engage in authentic and relevant learning experiences. (Bolotova et al., 2021) Additionally, pedagogical interventions in open and digital learning foster the development of technical digital skills and important soft skills such as collaboration.

Pedagogical interventions in open and digital learning have become increasingly significant and relevant in modern education. With the integration of digital platforms and tools in education systems, there is a need for pedagogical interventions to effectively harness the potential benefits of emerging technologies (Digital Pedagogy: Opportunities and Challenges of Learning in the Information Environment, n.d.) and enhance the overall learning experience for students (Cahlikova & Bundi, 2020). These interventions prioritise student engagement, active learning, and personalised learning experiences. By employing pedagogically-informed approaches, educators can leverage digital tools to create inclusive learning environments that cater to the diverse needs of students. Pedagogical interventions also address the development of crucial skills such as problem-solving, collaboration, creativity, and communication within digital technology (LeBlanc, 2019). These interventions are not solely focused on the technical aspects of using digital tools but also consider privacy concerns, the development of digital literacy among students and teachers, and the transformation of traditional teaching roles in the online learning paradigm (Khmelnyska et al., 2021).

Moreover, pedagogical interventions in open and digital learning emphasise the importance of developing both technical digital skills and soft skills for students (LeBlanc, 2019). By implementing pedagogical interventions in open and digital learning, institutions can ensure that technology is used effectively to create equitable educational experiences for all learners. These interventions can help bridge the gap between traditional face-to-face learning and e-learning approaches, facilitating a smooth transition to online education. Furthermore, the COVID-19 pandemic has accelerated the need for pedagogical interventions in open and digital learning.

CHALLENGES IN IMPLEMENTATION

One of the challenges in implementing pedagogical interventions in digital learning is the need for teachers to develop their digital competencies and integrate them effectively into their teaching practice. This may require professional development and teacher training opportunities to enhance digital skills and knowledge. Furthermore, there may be a need for more access to digital tools and resources, particularly for students from disadvantaged backgrounds or in remote areas. Implementing pedagogical interventions in digital learning also requires careful consideration of the different levels of accessibility and technological capabilities of students. Moreover, balancing new digital tools with practical pedagogical approaches can be another

challenge. Lastly, there may be resistance or hesitancy among teachers and educational institutions to adopt new pedagogical approaches and embrace digital technologies. Overall, the successful implementation of pedagogical interventions in open and digital learning requires a focus on sound pedagogical approaches in combination with digital technologies, addressing issues of access and equity, providing adequate support and training for teachers, and ensuring a willingness to adapt and embrace new approaches (LeBlanc, 2019). Overall, pedagogical interventions in open and digital learning can bring significant benefits such as increased student engagement, improved learning outcomes, enhanced collaboration and problem-solving skills, and increased educational opportunities. It is crucial to successfully address the challenges that come with implementing pedagogical interventions in digital learning. This requires a balance between privacy and openness in pedagogical practice, building digital literacy among teachers and students, transforming the traditional role of teachers in online learning, and considering the accessibility and individual capabilities of students when using digital tools (Khmelnyska et al., 2021). Additionally, pedagogical interventions in open and digital learning should focus on developing autonomous learning strategies within problem-solving contexts, incorporating digital technologies and emphasising soft skills such as collaboration, creativity, and communication (LeBlanc, 2019).

FUTURE PROSPECTS

The prospects of pedagogical interventions in open and digital learning are promising. Advancements in technology will continue to provide new opportunities for innovative pedagogical approaches, such as personalised learning, adaptive learning, and immersive virtual reality experiences. These advancements will enable educators to cater to students' needs and preferences, creating personalised learning experiences that promote deeper engagement and understanding. Additionally, the ongoing integration of artificial intelligence and machine learning in educational tools and platforms will further enhance the effectiveness of pedagogical interventions in open and digital learning. Through AI, educators can analyse student data, identify learning gaps, and provide personalised feedback and support.

In conclusion, pedagogical interventions in open and digital learning have the potential to revolutionise education by leveraging technology to enhance teaching and learning experiences. Educators can create engaging and effective learning environments by focusing on the development of autonomous learning strategies, incorporating digital technologies, and emphasising soft skills. The key to successful pedagogical interventions in open and digital learning lies in finding the right balance between utilising technological tools and implementing effective pedagogical practices. To achieve this balance, educators must continually stay informed about the latest research and best practices in educational technology and pedagogy. This will allow them to make informed decisions about which technologies to integrate into their teaching practices and how to use them to support student learning effectively. In addition to technological advancements, it is also crucial for pedagogical interventions to address issues related to privacy, digital literacy, and the changing role of teachers in online and open educational practices (Khmelnyska et al., 2021). By doing so, educators can ensure that pedagogical interventions in open and digital learning are inclusive, equitable, and beneficial for

all learners. Therefore, it is essential for educators to continuously adapt their pedagogical approaches and keep up with advancements in technology to effectively leverage its potential in promoting effective pedagogy in open and digital learning.

CONCLUSION AND RECOMMENDATIONS FOR FURTHER STUDY

In conclusion, pedagogical interventions in open and digital learning have the potential to significantly enhance education by leveraging technology and innovative teaching practices. However, for these interventions to be effective, educators must balance utilising technological tools and implementing sound pedagogical practices. They should also focus on developing autonomous learning strategies, incorporating soft skills, and addressing privacy and digital literacy issues. To further study this topic, researchers can explore the impact of specific pedagogical interventions in open and digital learning on student learning outcomes. Additionally, researchers can investigate the best practices for integrating digital technologies into pedagogical approaches and examine the effectiveness of different pedagogical models in online and digital learning environments. Furthermore, research can delve into the challenges educators face in implementing pedagogical interventions in open and digital learning and explore strategies to overcome these challenges to optimise the benefits of technology in education.

In conclusion, pedagogical interventions in open and digital learning are crucial for promoting effective teaching and learning in today's digital world (LeBlanc, 2019). These interventions should prioritise open pedagogical approaches that foster autonomous learning and the integration of digital technologies. Additionally, educators should focus on developing students' digital literacy skills and addressing privacy and security issues in online learning environments. It is also essential for educators to continuously adapt their pedagogical approaches and stay updated on advancements in technology. By doing so, educators can effectively leverage the potential of technology in promoting effective pedagogy and enhancing student learning outcomes. Thus, educators must consider pedagogical approaches when designing and implementing digital educational resources. These pedagogical approaches aim to optimise engagement and learning beyond mere learning outcomes. This includes a shift towards more pedagogically informed approaches to digital learning and teaching that prioritise student engagement and active learning and the use of digital tools to support personalised and inclusive learning experiences.

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CHAPTER THIRTEEN

E-LEARNING AND SOFT SKILLS DEVELOPMENT IN TECHNOLOGY-ENABLED LEARNING ENVIRONMENT: A LITERATURE REVIEW

Ritu Sharma

ABSTRACT

The paper aims to draw the lines that link e-learning to soft skill development. The prime objective of the study was to understand and get conceptual clarity, define the inclusions and exclusions in the theory and explain the relationship between e-learning and soft skill development. Also, the study explores the avenues around whether e-learning can substitute traditional learning for soft skills development based on the applicability of the information and communication technology milieu. For this purpose, a systematic review of the literature methodology of exploratory research was carried out, looking into the reputed resources. The sources that we relied on were relevant journals, books, reports, and various published sources. It was found that e-learning helps learners to have greater access to quality education with inclusive skill sets for future job requirements. The approach by which knowledge is delivered is indeed being restructured by internet and multimedia technologies, which has led e-learning to become a natural alternative to traditional learning. Based on the synthesis, several theoretical underpinnings related to e-learning and soft skills development were provided. Conceptual clarity about the topic can help industry and academia build a sound understanding as soft skills have been prioritised recently in determining the employability, growth, and development of the youth.

Keywords: E-learning, Soft Skill Development, Personalized Learning, Information and Communication Technology (ICT).

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INTRODUCTION

The loom of instructing and learning, which utilises modern information and communication technologies to systematise the learning and development process, thereby creating a comprehensive technology-based learning environment, is known as E-learning. In the current ICT-dominated learning environment, individuals are using mobiles, computers, tablets, etc., as a means of learning as they have become major sources of learning for them, which they can access at any time and space. The learner's interest has to be given utmost importance in this modern era of mass personalisation and customisation, and it is where e-learning comes in handy as it enables the learner to specifically arrange most of the things that he/she wishes to learn. E-learning involves technology that complements or supplements traditional learning with various technology-oriented mechanisms and establishes an ICT-based education and training system (Imran, 2012).

E-learning is on the growth pathway towards becoming an extensively used method of imparting education. It might be relevant to assert that e-learning has, to some extent, replaced or is going to replace traditional forms of learning in all spheres of education, training and development and, more particularly, skills development. Skill development involves the development of an individual's soft skills. Because of this, a possible linkup/connection between E-learning and soft skills development can be explored and depicted. Soft skills refer to personal attributes, dispositional traits, communication ability, problem-solving, creative thinking, decision-making, and interpersonal competencies. It implies intrapersonal and interpersonal skills allied to emotional intelligence, facilitating interactions and personal development.

Traditionally, only hard skills were considered necessary for employment, but in today's context, only hard skills are insufficient. Finch *et al.* (2013) study replicated that specific soft skills, namely interpersonal and communication skills, affect employability and are presumed valuable in work environments. As such, employers highly appreciate soft skills; there is an essential need to devise individuals with well-rounded soft skill quotient.

The pervasiveness of digital technology has fundamentally revolutionised the process of creating new opportunities for education, skills and training. Besides education and training benefits, ICTs help to identify the emerging potential skill needs in the labour market. E-learning may be spread physically with changing boundaries of time and can integrate direct and indirect access. E-learning has taken the form of courses, modules, and smaller learning objectives (Wentlig *et al.*, 2000). These modules and objectives act as a guiding light on the movement towards overall and integrated skill development. This urges us to study the relationship between e-learning and soft skills development. Further, the role played by e-learning in developing soft skills enhances employability among learning prospects.

PURPOSE STATEMENT

It has been palpable that ICT-enabled learning has been making a buzz around the world for some years now. Since coming onto the scene, e-learning has caused disruptions in every field where it has profound relevance and feasibility. Any sector that we look around be it R&D or be it medical

and pharmaceutical, be it defence or be it banking, be it agriculture or be it manufacturing, be it training and education or be it high profile business and corporate world, we come across much evidence of disruptions caused by e-learning in the area of learning activities being executed with the help of ICT. We may come across online manuals teaching labourers working in some manufacturing unit to operate a machine, online orientation training being carried out in some corporate setup, online conferences and seminars for defence personnel posted in some far-flung area, many online guiding resources for farmers aimed at helping them carrying out their farming activities fruitfully, online lectures and training being conducted for medical students and interns in some college or university and so on. In another considerable example, the government of India has mandated MOOCs (Massive Online Open Courses) by introducing SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) at the higher education level, which is open nationwide. All this evidence has led us to depict that the area of skill development might have remained intact and undisrupted by e-learning.

This depiction of ours' was further strengthened and consolidated by reviewing the literature regarding skill development, as learning is directly known to support skill development. Hence, we further our conception that e-learning, like traditional learning, supports skill development. Further, it has been known that in current times, soft skills and their development have received quite a lot of attention from both academia as well as industry, which leads us to work on the idea of soft skill development keeping in synchronisation with the e-learning environment being developed in academia and industry at large. So, keeping our conception in line, in this paper, we look to explore the idea of how e-learning has the potential to ease the process of soft skills development, like skill development in academia as well as industry. Moreover, we would like to explore the idea that e-learning can cut costs, save time, and offer other advantages. Keeping this objective in mind, we browsed for quality journals and other relevant sources and formed a database that kept our purpose in mind. Further, a thorough and variable-wise literature review was conducted to provide a clear conceptual understanding of the subject matter.

RESEARCH METHODOLOGY

The research focuses on studying the relationship between e-learning and soft skill development. The purpose systematic review of literature methodology of exploratory research was carried out by looking into the reputed resources focusing on building up a concept matter, reports, and various other published and unpublished sources to acquaint ourselves with the variables of the topic (Strukelj, 2018). After having analysed the literature for the present research, we came up with some essential theoretical underpinnings and synthesis of the whole work, along with resultant findings and pertinent implications, which are discussed in the later section of the paper.

REVIEW OF LITERATURE

E-learning is on the pathway of growth towards becoming an extensively used method of imparting education, training and development premises with lots of problems faced in terms of its implementation and technology advancements, and this will continue with enhancing the use of the latest tools and techniques. Knowledge management will influence education quality via

sharing knowledge and information (Sammour *et al.*, 2008). Suppose the appropriate resources on hand are appropriately utilised, and sufficient information is made available by someone already well-versed with the prerequisites and rationale of the learner. In that case, there are hardly any restrictions on the learner in meeting their purpose (Vivekananda & Ruvn, 2017).

E-learning over Traditional Learning

E-learning helps learners to have greater access to quality education with inclusive skill sets for future job requirements. As depicted from the recent trends, the approach by which knowledge is delivered is indeed being restructured by internet and multimedia technologies, which has led e-learning to become a natural alternative to traditional learning (Zhang *et al.*, 2004). It is to be noted that e-learning determines learning behaviours and learning opportunities, which control learning outcomes like performance and skill development (Van Gelderen, Van de Sluis & Jansen, 2005). E-learning as a practical learning mode is vital in student-sustainable education, particularly skill development (Diamond & Irwin, 2013). Therefore, e-learning assists learners in having greater access to quality education with an inclusive skill set.

1.1. E-Learning as an Enabler for Soft Skills Development

The present higher education curriculum has highlighted the importance of empowering learners with soft skills readily applicable to the world of work. E-learning is a strategic and effective enabler of scaling skills to succeed in employment outcomes (Accenture, 2015). Based on student-centred learning for developing soft skills, e-learning encourages integrating powerful learning experiences. It fosters applying soft skills to real-world contexts, creating sustainable futures (Azeitero *et al.*, 2015).

Incorporating e-learning as a didactic process would help develop the soft skills desirable for future professionals (Stal & Paliwoda-Pekosz, 2019). Yan *et al.* (2003) conducted a research study on using e-learning practices in the education system. They found that e-learning as a learning phenomenon helps develop and improve the student's skill set through cognitive, affective, and social processes. Also, the study indicated that e-learning-based practices benefit educational systems, and corporate organisations were also active areas of e-learning practice for soft skills.

Moreover, the Organization for Economic Co-operation and Development (2016) study elucidates the emergent use of digital technologies, which is enormously increasing the demand at work and generates significant opportunities for skill sets and ICT use. Soft skills are closely associated with the integration and interrelation of ICT and the synergy between soft and ICT-based skills. E-learning is commonly used in soft skills training and is also influenced by ICT (Van Diepen *et al.*, 2009). E-learning is an enabler of developing soft skills that help learners or graduates succeed in future employment outcomes.

E-learning for imparting soft skills training: Evidence

The growing use of digital technologies at work is increasing the demand and creates remarkable opportunities for novel skill sets and ICT (OECD, 2016). In higher education, e-learning is significant in effective life-long learning and education for sustainable development (Azeitero *et al.*, 2015). Various organisations use E-learning as the delivery mode to impart soft skills. The relevance of employee's soft skills has also received increasing attention in the workplace (Ingols & Shapiro, 2014; Shuayto, 2013). Economist Intelligence Unit Report (2015) identified that workplace problem-solving, teamwork, and communication skills are presently stipulated. Most of the typical businesses taught soft skills using e-learning practices in their organisations. Specifically, at Nestle, e-learning instructs employees on communication and teamwork skills (DeRouin *et al.*, 2005). Similarly, Dobbs's (2000) study replicated that Bank of America uses e-learning practices in their organisation for imparting interpersonal skills.

Synthesis and Theoretical Underpinnings

Technology intensely impacts the skills employers demand from graduates today (Mitchell, Skinner & White, 2010). A paradigm shift from a production to a service-based economy has significantly demanded increased attention to soft skills among students in specific (Lavy & Yadin, 2013). The changing demand for work and employment patterns have led to reconsidering skills desired by the graduates seeking employment. Addressing this, Academia across the globe is progressively required to produce highly skilled graduates responding to the changing needs of the contemporary workplace (Weil, 1999; Sleezer *et al.*, 2004; Possa, 2006), and it is thought that ICT-based learning or e-learning can help in doing so at a rapid pace as it saves a lot of time and curriculum that it promotes is user-specific and targeted for the specific requirement for the job. Based on our synthesis, the following are the theoretical underpinnings of the relation between e-learning and soft skill development:

E-learning as Experiential Learning & Experiential Learning for Soft Skills Development

Experiential learning is viewed as a cognitive process that leads to experiential learning. Experiential learning is guided by certain principles, including addressing real-world problems, promoting hands-on learning and engaging in direct experiences. Hesser's (1995) study assessed experiential learning perception and established that experiential learning can significantly improve life skill development. In this pursuit, Wurdinger and Allison's (2017) findings of the study reveal that 97% of faculty perception believe that various skills, namely communication skills, critical thinking skills, problem-solving skills, teamwork skills and creative thinking skills, seem to be enhanced through service learning as an effective method of experiential learning. Similarly, Marini and Tillman's (1998) study remarked that students engaged in experiential learning-based practices can enhance their soft skills stipulated by the employer's needs. E-learning focuses on specific and contemporary issues by providing the latest available information extracted from the internet and media and relies on the maximum involvement of a person to experience the topic of interest in all its relevance and dimensions, thereby promoting a lasting learning experience among its users.

E-learning as Individual/Personalized Learning & Individual/Personalized Learning for Soft Skills Development

E-learning has evolved individual learning by personalising learning experiences. More specifically, the advent of e-learning has led to the personalisation of learning opportunities, which are now readily available to the individual. For this reason, we can depict individual learning as being aided and facilitated by e-learning in the current scenario. E-learning always considers individual learner differences (Arkorful & Abaidoo, 2014).

The introduction of digital technology has facilitated the specific student-centred learning paradigm as an innovative form of learning. Digital technology in the form of e-learning helps to advance the quality and responsiveness of exchange interactions between the learner and the teacher. Primarily, e-learning enables instantaneous interactions and immediate feedback, allowing teachers to personalise their instruction according to the aspirations of individual learners (Karkkainen & Vincent-Lancrin, 2013). Even real-time assessments are frequently used as a part of personalised learning experiences reinforcing the requisite soft skills (OECD, 2016).

E-Learning encourages Collaborative Learning for Soft Skills Development

Research evidence suggests that learning is a social process in which knowledge is constructed through negotiation, interactions, and cooperation (De Corte, 2010). A digital technology-enabled learning environment facilitates working in groups and interacting with each other (Economist Intelligence Unit Report, 2015). E-learning systems support collaborative communication and interactions between instructors and peers (Arkorful & Abaidoo, 2014).

Wagner, Hassanein, and Head's (2008) study established that e-learning makes prospects for interactivity during content delivery accessible. This has led to a rise in collaboration between teachers and students, making comparing and sharing the material much easier (Economist Intelligence Unit Report, 2015). Aligned with a digital technology-enabled environment, it considers and contributes to problem-solving skills, team activity and collaborative performance (Karkkainen & Vincent-Lancrin, 2013). Thus, collaborative learning fosters a wide array of soft skills, namely teamwork, communication, and high-order thinking skills, by imposing and engaging real-world complex problems and challenging situations in real-life practices. Therefore, such digital-based pedagogies focusing on collaborative inquiry are encouraged through e-learning and ICTs (OECD, 2016).

E-learning for Soft-skill focused Training and Development

Education and training are the two levels on which e-learning can be scrutinised in the current scenario. It can be utilised for both elementary and higher education. When we talk about its application at the training level, it can be helpful for organisations that are looking to train their employees by developing their exceptionally soft skills. Enhancement of various skills, namely communication skills, adaptability, decision making and problem-solving skills of an individual or an employee in an organisation; overall, the soft skills can be learned from training (Arat, 2014), which is facilitated in the current scenario by e-learning.

Knowledge and information delivered using e-learning are delivered rapidly to learners, which can save a lot of time and resources. In the corporate sector, some organizations, being the first movers, have tried to replace face-to-face meetings, demonstrations, training, and development programs with technology-based learning, i.e., e-learning (Aggarwal, 2009). In view of this, e-learning is an applicability for soft skills development as a readily and easily available option that can help organizations save a lot of resources, particularly for soft skills development.

FINDINGS AND IMPLICATIONS

The widespread availability and usage of ICT resources have led to the personalisation of learning experiences for individuals, and that's why it has led to the evolution of the sphere of individual learning and experiential learning. Proper theoretical and conceptual clarity about the topic can help industry and academia build a sound understanding of soft-skills development among the prospects, as soft-skills have been prioritised recently in determining individuals' employability, growth and development. Relying on e-learning for soft-skills development can save a lot of time and resources, and most importantly, being user-specific, e-learning can prove to be very efficient and result-oriented when it comes to soft-skills development.

Thus, by speeding up the learning process for soft-skills development and eliminating the wasteful actions involved in the process, making it an anywhere-anytime phenomenon, e-learning can prove to be of utmost utility when it comes to soft skills development from the perspective of employability and productivity. It is to be mentioned explicitly that the present study is not sector-specific. Still, after having acquainted us with the concept, sector-based research can be pursued to validate our propositions further. Most importantly, in the current times of cautionary measures of lockdown because of the COVID-19 outbreak, e-learning has become an imperative and convenient source of imparting education and carrying out training sessions using online classrooms, chat rooms, webinars, online workshops and conferences, which depicts that even after that, e-learning can be an effective and reliable option for imparting soft-skill focused learning and training.

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CHAPTER FOURTEEN

ONLINE LEARNING AND ITS TRANSFORMATIVE IMPACT ON DIGITAL LEARNING IN HIGHER EDUCATION INSTITUTIONS

S. Mekala, K. Mohana Aishwarya and T. Sangeetha

ABSTRACT

The increase in emerging technologies and digital tools has instigated the transformation of higher education towards digital learning. The COVID-19 pandemic has accelerated the integration and use of online platforms and digital learning in academia. The advent of online education is a distinctive outcome of the 21st-century digital milieu. However, due to the sudden shift to online education, both students and teachers have faced a myriad of challenges in the implementation of online learning. In this regard, a questionnaire has been administered to explore the efficacy of online education during the pandemic. The study focuses on the experience of the students during the online learning. The responses of the students (n=36) are analysed to identify the constraints they faced during online education. The study also endeavours to provide recommendations on overcoming the constraints identified in online education. The findings of the study would serve to comprehend the present scenario of online education in higher education institutions and identify the areas that require improvements. Additionally, the study aims to examine the gender differences and the motivational level among the participants, providing a

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comprehensive understanding of the various factors impacting online education. As academia moves towards blended learning, open education, and digital learning, this study would contribute towards facilitating a conducive environment for the effective implementation of online learning and teaching among students and teachers.

Keywords: - Online Education, Students' Perceptions, Motivation, Post-Pandemic Era, Open Education.

INTRODUCTION

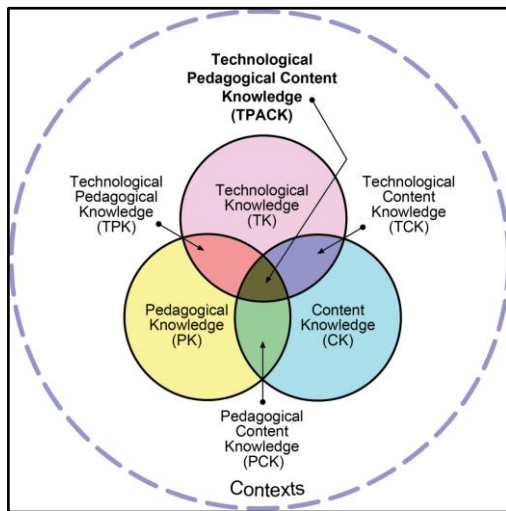
The field of higher education has undertaken a paradigm shift towards digital learning. Recently, higher educational institutions (HEIs) have been progressing towards integrating digital methodologies into the teaching and learning process, transforming conventional pedagogical approaches. This evolution was hastened during the COVID-19 pandemic. During the implementation of online sessions, teachers and students faced diverse challenges and employed various strategies to overcome them. In this technology-driven 21st century, academia is moving towards digital learning, blended learning, and flipped classrooms. The implementation of online learning during the pandemic has had a profound and transformative impact on integrating digital learning in higher education. Thus, it is crucial to review the lessons learned from the implementation of online learning and apply them to effectively implement digital learning initiatives.

In this regard, this study explores the efficacy of online teaching and learning during the pandemic. It focuses on the digital sources used by students to attend their online sessions, the teaching methodologies and assessment patterns followed in the online sessions, the constraints faced by students, their motivation levels, and their perceptions of online versus offline sessions. The study also examines gender differences in students' perceptions. The objective is to analyze the various factors impacting online learning and the constraints faced during online sessions in higher education. This study aims to contribute to the literature on online education by presenting the current scenario, identifying areas requiring improvement, and providing recommendations for effectively implementing online learning and digital education.

THEORETICAL FRAMEWORK

The theoretical framework of this study pivots on the Technological Pedagogical Content Knowledge (TPACK) Framework introduced by Mishra and Koehler in 2006. It offers an effective approach to integrating educational technology in the classrooms. This framework emphasises technological knowledge (TK), pedagogical knowledge (PK) and content knowledge (CK). Content Knowledge refers to teachers' knowledge of the subject matter. Pedagogical Knowledge includes teachers' knowledge of the practices and methods regarding teaching and learning. Technological Knowledge describes teachers' knowledge and ability to use various technological tools.

Figure 1
TPACK Framework



Note. From <http://tpack.org>

As portrayed in Figure 1, TK, PK, and CK are combined and recombined in various ways within the TPACK framework. The centre of the diagram - TPACK - represents a complete understanding of how to teach with technology. It is important to note that this holistic understanding is not equivalent to the individual knowledge of the three primary concepts. Thus, the idea of TPACK is understanding the use of technology in teaching so that the students' learning experience is enhanced. This framework has been used to analyse the efficacy of online education during the pandemic. In concordance, the efficacy of the content delivered by the teachers, the teaching methods and strategies employed by the teachers, and the digital tools used by teachers have been analysed along the lines of students' active participation, knowledge and comprehension level, and motivation.

REVIEW OF LITERATURE

Aziz (2015) postulated that online learning or e-learning indicates any form of pedagogy delivered using digital technology like visual graphics, text, animations, videos and audio. Aristovink et al. (2023) have opined that the transition from traditional learning to online learning has entailed a remarkable transformation in the field of education, requiring changes in teaching practices and paving the way for new learning approaches. Naik et al. (2020) have pointed out that the sudden transition of teaching methods to online classes during the pandemic has resulted in confusion in both students and faculty members.

Dhillon and Murray (2021) have investigated the EAP teachers' point of view and their experiences with e-learning technology. Their findings show that e-learning increases learner engagement and motivation. Sun and Chen (2016) have acknowledged that well-structured course material, knowledgeable teachers, cutting-edge technology, feedback, and clear directions are all necessary for an effective online course. Wargadinata et al. (2020) have emphasised that online learning becomes effective when it facilitates the use of various applications such as 'WhatsApp',

'Zoom' and 'Google Classroom'. Fauzi and Sastra (2020) have reiterated that online learning would be ineffective when conducted inappropriately, especially with reference to unsuitable internet facilities, teachers' inability to implement online learning, and parents' lack of cooperation. Allawamleh et al. (2020) have identified that accessibility, familiarity, and internet connectivity play a crucial role in ensuring an effective online learning system, as these may not be uniformly distributed across a country.

Brazendale et al. (2017) have emphasised that teachers and students face challenges due to a lack of appropriate learning materials, their attitude to learning, lack of self-discipline, and the inadequate learning environment in some of their homes during self-isolation. Song et al. (2004) have observed that the major barriers to online learning include students feeling a lack of learning community, experiencing technical problems, and having difficulty in understanding instructional goals. Mohd Najib et al. (2017) have established that students' attitudes influence the effectiveness of online learning, and students with a careless attitude are a challenge in online learning. Li and Wang (2019) have expressed that students find online teaching boring and unappealing as online teaching videos are too long and reduce learners' enthusiasm and interest in learning. In this line, Partlow and Gibbs (2003) have recommended that online programs should be creative, interactive, relevant, student-centred, and group-based. Ponnusamy and Perumal (2023) have revealed that most students engaged in academic activities at an average level during the pandemic. Saidon et al. (2020) have suggested that during online sessions, students should be encouraged to utilise the learning opportunity, improve their interpersonal skills, and enhance their technical adaptability.

According to Collazos et al. (2021), the teachers could not provide the students with remote care and timely feedback on their academic performance during online sessions, which has resulted in students being dissatisfied with online learning. Jha et al. (2023) have conducted a study and proposed that students have a fairly favourable attitude toward online classrooms, as they offer flexibility and convenience to the students. Nevertheless, majority of students have also acknowledged that due to technological limitations, delayed feedback, and the teachers' inability to manage ICT tools effectively, online programs may be more difficult than traditional programs.

Thus, studies have been conducted on the effectiveness of online learning and the challenges and restrictions faced in digital education. Consequently, this study has been undertaken to analyse the efficacy of online learning in HEIs during the pandemic with respect to the TPACK framework and provide recommendations for the effective implementation of digital learning.

METHODOLOGY

Research Design

In this study, the convenient sampling method is used in which the target audience is selected based on their accessibility, demographic details and convenience. In this line, the responses have been collected from 36 final-year English major students (22 males and 14 females) of Mary Matha College of Arts & Science, Theni, Tamil Nadu.

Tools Used in the Study

This action research has adopted the survey method to solicit the perceptions of the students on online education during the pandemic. A questionnaire has been administered on the target population, and the collected responses have been subjected to both quantitative and qualitative analysis. The designed questionnaire comprises a total of 48 questions. Part I (1-8) of the questionnaire elicits the demographic particulars of the respondents, and Part II (1-40) of the questionnaire ascertains the students' views on online learning focusing on the aspects of the efficacy of online education and constraints faced during the online sessions. In this study, the majority of the questions have been ranged in a four-point Likert scale, with few 'yes' or 'no' questions. Some questions with multiple options and inferential questions have also been asked in the questionnaire.

DATA ANALYSIS AND FINDINGS

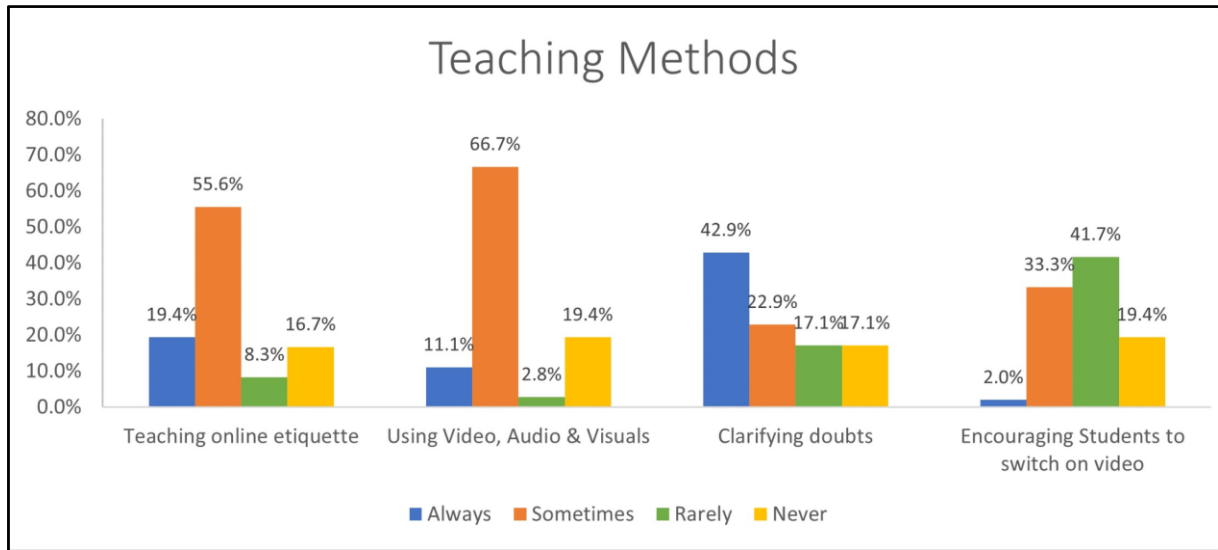
Teaching Methodology

Schmidt and Werner (2007) opine that in online teaching, "instruction must be designed for experiential and authentic learning." In line with this, the activities conducted by faculty members during online sessions have been analyzed. Based on the responses, online quizzes (50%), presentations (44.4%), Q&A sessions (33.3%), game-based activities (13.9%), and online debates (8.3%) have been conducted. Notably, when students were questioned about the activities provided during their online sessions, none of the students chose storyboarding (a storyboard is a visual representation of how a story will play out, scene by scene) or collaborative worksheets.

Additionally, teachers provided course materials to students as supplements for their online classes during the pandemic. Based on the responses, PowerPoint presentations were widely used at 61.1%, followed by reading materials in either PDF or Word format (44.4%), and recorded online sessions and podcasts (2.8%). Moreover, it is important to note that 11.1% of the students responded that none of the above materials had been provided to them, and none of the respondents chose e-books or infographics.

The analysis of the activities conducted and course materials provided during online sessions offers practical insights into the strategies utilized by the teachers. The predominance of PowerPoint presentations as supplementary course material and the use of online quizzes, presentations, and Q&A sessions reveal the educators' visual and interactive approach to the course content. Similarly, providing reading materials in PDF or Word format highlights the importance of textual content. This also shows the efforts of faculty members to broaden their teaching methodologies to maintain students' active participation during online learning. On the other hand, the limited use of storyboarding and collaborative worksheets, recorded online sessions and podcasts, and e-books and infographics indicates the unexplored possibility of incorporating media to enhance student engagement in learning. Thus, faculty members should improve their digital literacy and endeavour to utilize recent technological advancements more effectively, integrating them into their teaching methodology, especially in online classes.

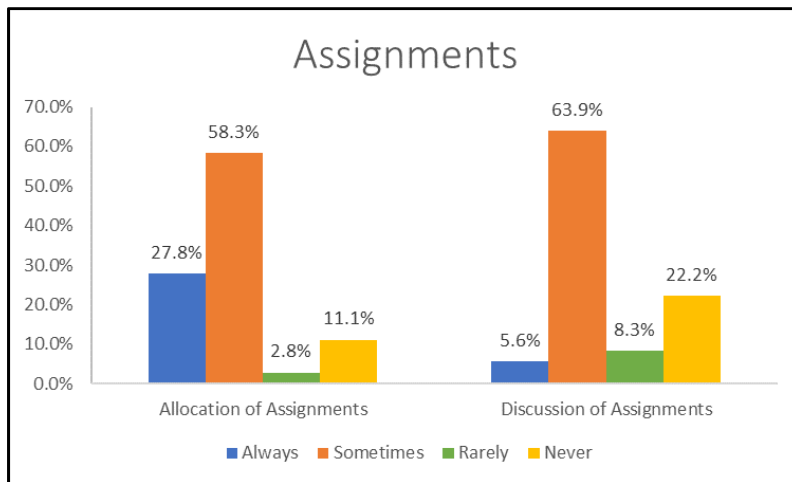
Figure 2
Teaching Methods Followed During Online Sessions



The students' perceptions of the teaching methods followed during the online sessions are portrayed in Figure 2. Regarding the instruction of online meeting etiquette before or while attending the online sessions, 19.4% of the students have answered 'always', 55.6% have answered 'sometimes', 8.3% have answered 'rarely', and 16.7% have answered 'never'. Pertaining to the use of video, audio, or visual images by the faculty members during their online sessions, 11.1% have responded as 'always', 66.7% as 'sometimes', 2.8% as 'rarely', and 19.4% as 'never'. With respect to the faculty members having time to clarify the students' doubts during the online sessions, 42.9% have answered 'always', 22.9% have answered sometimes, 17.1% have answered 'rarely', and 17.1% have answered 'never'. When enquired whether the faculty members encouraged the students to face the online participants by switching on the video during their presentations/ interactions, 2% have responded 'always', 33.3% as 'sometimes', 41.7% as 'rarely', and 19.4% as 'never'. The acknowledged hesitation in not switching on the video by the students during their online sessions may be due to poor internet connectivity. In order to overcome this technological constraint and to verify the participation and attention of the students in online sessions, it would be a better option if faculty members could ask the students to switch on their videos only during interactions, discussions, and Q&A sessions in such least cases.

Figure 3

Allocation and Discussion of Assignments During Online Sessions



Assignments play a significant part in higher education. It helps in the continuous learning process. It also enables them to improve their responsibility towards studying, time management, competency, and potentiality. According to Cooper et al. (2006), “the effect that an assignment has on success differs from one learner to another learner, based on how many assignments are given and how much the learner does it”. In this line, when the students have been enquired about the allocation of assignments to be submitted during online sessions, 27.8% have answered ‘always’, 58.3% have answered ‘sometimes’, 2.8% have answered ‘rarely’, and 11.1% have answered ‘never’. Further, on analysing the administered assignments, it has been revealed that the assignments have been mostly questions based on the syllabus that has been taught during the online sessions (41.7%), creative questions (38.9%), topics apart from what has been dealt with in the online classes (36.1%), assignments to refer the internet and write (8.3%), and problem-solving questions (5.6%). It is important to give challenging and creative assignments to the students according to their skill level. According to Flow Theory (Csikszentmihalyi, 1990), there has to be a balance between the perceived challenge of a task and an individual's skill level. If the challenge of the task/assignment is higher than the individual's skill level, it would result in anxiety. On the other hand, if the challenge of the task/assignment is lower than the individual's skill level, it would result in boredom. Therefore, tasks and assignments administered to the students should be curated to their skill level so as to sustain the students' motivation and engagement.

Regarding the discussion of the submitted assignments during the online classes, 5.6% have answered ‘always’, 63.9% have answered ‘sometimes’, 8.3% have answered ‘rarely’, and 22.2% have answered ‘never’. A gap could be observed between the allocation and discussion of assignments, as depicted in Figure 3. “Feedback is considered as a vital approach to facilitate students' development as independent learners in order to monitor, evaluate, and regulate their own learning” (Ferguson, 2011). Timely feedback has proven to be very effective in providing motivation, shaping behaviour, and developing mental constructs (Shepard, 2000). Mamoon-Al-

Bashir et al. (2016) have suggested that e-mail is one of the effective ways to provide personalised feedback to students. Lee et al. (2020, as cited in Özışık, 2021) have also highlighted that sharing the students' progress in online exams through e-mail would enable students to organise their learning process and increase their self-awareness. Moreover, the teachers could also overcome the time constraint of handling a large-size mixed-ability classroom by providing feedback and suggestions for improvements in assignments through e-mail rather than during class hours. Furthermore, this method is more suitable for online learning, as students also prefer to submit their assignments and assessments electronically.

Assessments

“Assessment can be defined as all activities that teachers and students undertake to get information that can be used to alter teaching and learning” (Amua-Sekyi, 2016). It determines the knowledge of the students and skills in a particular subject. “Assessment is also used in ‘selecting, controlling or motivating students, and to satisfy public expectations as to standards and accountability’” (Biggs, 2003). The assessment methods followed by the faculty members during online sessions were assignments (44.4%), online quizzes (41.7%), presentations (25%), and online written tests (13.9%). The question pattern during the online exams included one-word answers (58.3%), short answers (55.6%), long answers (41.7%), and MCQs (11.1%). The students submitted their assessments for evaluation during online sessions as objective questions in Google Forms (66.7%), short answers in Google Forms (38.9%), and uploaded comprehensive answer scripts (22.2%).

Figure 4

Students' Perception of Online Assessments

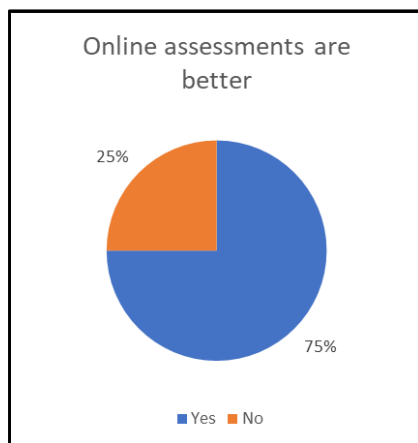
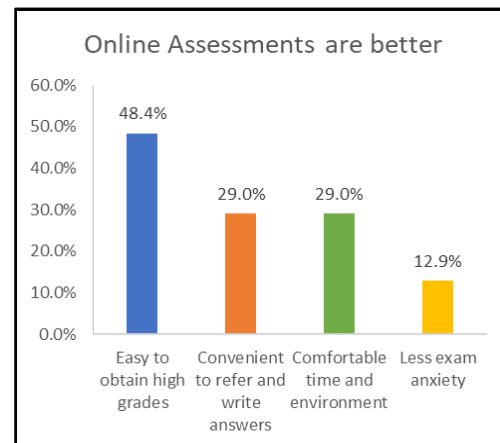


Figure 5

Reasons Why Online Assessments Are Better



When the students were asked whether online assessments are better than offline assessments, 75% of students have responded ‘yes’, and 25% have said ‘no’, as portrayed in Figure 4. On further enquiring the reasons why online assessments are better, 48.4% of students have said that it was easy for them to obtain high grades, 29% have said that they were in a comfortable time and environment during the online assessments, 29% have said it was convenient for them to refer and write the answers, and 12.9% have said they felt less anxious during the assessments (as indicated in Figure 5).

The preferences for online-based assessments indicate a positive response towards online learning among the students, as shown in Figure 4. Nevertheless, according to Azizi (2022), “the conceptualization of fairness should be reshaped in e-assessment practices such that it can be useful for testing stakeholders to implement quality e-assessment procedures, leading to quality education”. The reasons acknowledged by the students like ‘convenient to refer and write answers’ expose some unfair advantages of online assessments. Given the significant nature of assessments in education, serious measures must be taken to ensure the conduct of fair and valid assessments in the digital learning environment. Formative assessment is more suitable for online learning than summative assessment. In online classrooms, assessment methods like open-book tests, assignments, quizzes, presentations, and debates could be conducted with the help of diverse pedagogical tools like Kahoot, Quizlet, Kialo, and Flipgrid to facilitate continuous evaluation of the students. Further, plagiarism detection tools should be incorporated by the faculty members to enhance academic integrity in the online learning environment.

Digital Sources Used by the Students

Basar et al. (2021) defined that “online learning is defined as a teaching and learning process between teachers and pupils that involves various digital mediums, such as 'WhatsApp', 'Zoom', and 'Google Classroom'.” Online platforms and applications such as Microsoft Teams, Zoom, Google Classroom, WebEx, Blackboard, and Moodle have been employed by HEIs to handle the online sessions. According to the responses (presented in Figure 6), Zoom has been used predominantly as the online teaching platform (58.3%), followed by Google Classroom (38.9%) and Microsoft Teams (2.8%). This highlights the highly prevalent implementation of technology in HEIs.

Figure 6
Digital Platform Used

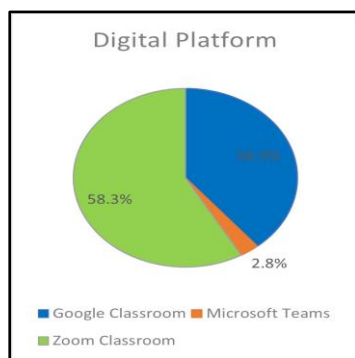


Figure 7
Device Used

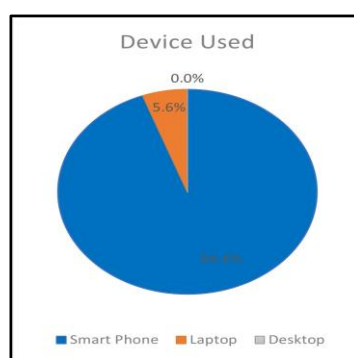
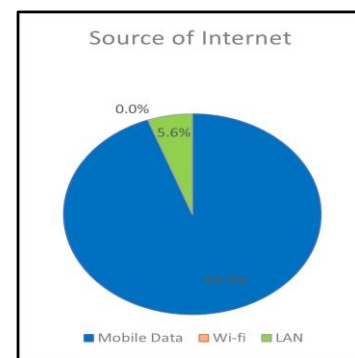


Figure 8
Source of Internet Used



Regarding the devices used by the students to attend their online sessions, as represented in Figure 7, 94.4% of students have used their Smart Phone, while 5.6% have used their Laptop and none (0%) have used their Desktop. In the case of the source of Internet access used to attend their online classes, as depicted in Figure 8, 94.4% of students have used their Mobile Data, 5.6% have used their LAN, and none (0%) have used their Wi-Fi access. According to Fauzi and Sastra (2020), challenges faced by students during their online learning become evident when they rely on smartphones and mobile data for attending their classes. This is an identification of the prevalent limitations in access to more appropriate electronic devices and reliable internet

connectivity. This indicates that digital equity and digital inclusion have to be improved among students as it hinders their online learning experience. As a socio-economic initiative, certain state governments like Tamil Nadu and national institutes like NIT-Tiruchirappalli have distributed laptops to socio-economically disadvantaged students.

Students' Participation

According to the study, as indicated in Figure 9, 30.6% of the students have spent less than 3 hours, 58.3% of the students have spent 3-4 hours, 8.3% have spent 5-6 hours and 2.8% have spent 7-8 hours in a day on average in their online classes. It could be observed that majority of the students have spent 3-4 hours in their online sessions. Regarding the students' ability to listen actively in each session, as depicted in Figure 10, 22.2% have answered 'less than 15 minutes', 52.8% have said '15-20 minutes', 16.7% have answered '25-30 minutes' and 8.3% have said '35-40 minutes'.

Figure 9

Students' Time on Online Session

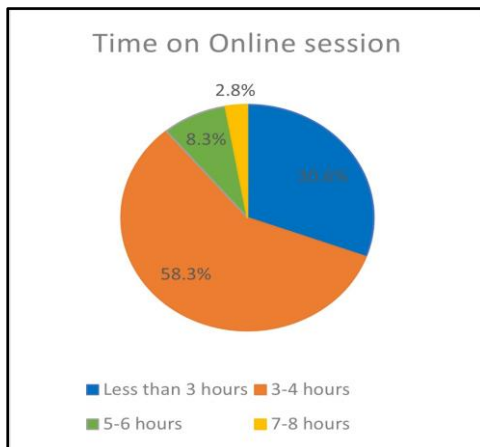
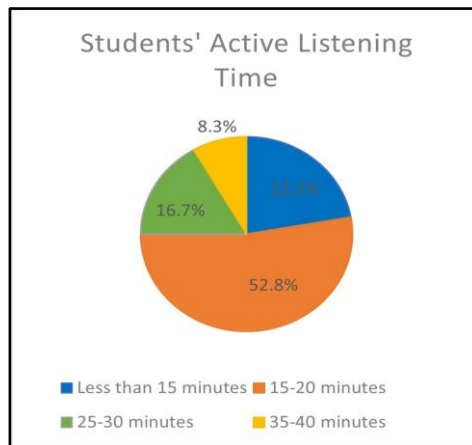


Figure 10

Students' Active Listening Time



On asking doubts during online sessions, 11.1% of students have answered 'always', 22.2% have answered 'sometimes', 41.7% have answered 'rarely', and 25% have answered 'never'. In the case of handling presentations during the online sessions, 5.6% of the students have responded 'always', 50% have responded 'sometimes', 22.2% have responded 'rarely', and 22.2% have responded 'never'. It could be observed from Table 1 that there is a low frequency of asking doubts to the instructors ($M = 2.19$) and handling presentations ($M = 2.39$) during their online sessions. This highlights the inherent gap in setting up an interactive and engaging online learning environment. The data denotes that female students are relatively more participatory than their male counterparts during online sessions, as they are curious to learn and so clarify their doubts and handle online presentations effectively without any diversions.

Table 1*Descriptive Analysis of Students' Participation in Online Sessions*

	A	S	R	N	Overall		Male		Female	
	%	%	%	%	M	SD	M	SD	M	SD
Asking Doubts	11.1	22.2	41.7	25.0	2.19	0.95	2.00	1.07	2.50	0.65
Handling Online Presentations	5.6	50.0	22.2	22.2	2.39	0.90	2.18	0.96	2.71	0.73

A-Always; S-Sometimes; R-Rarely; N-Never; M-Mean; SD-Standard Deviation

Additionally, when asked whether it was difficult or easy to understand the course content during online sessions, 13.9% of students said it was 'very difficult', 55.6% said it was 'difficult', 16.7% said it was 'easy', and 13.9% said it was 'very easy'. Next, the target audience was asked to rate their knowledge level in understanding the core subjects during the online sessions. 5.6% of students have rated themselves as 'excellent' in their understanding level, 11.1% have rated as 'good', 75% have rated as 'average', and 8.3% have rated as 'poor'. Further, when the students were asked to rate their comprehension and retrieval level during the online sessions, 13.9% of students have rated themselves as 'excellent', 27.8% have rated themselves as 'good', and 58.3% have rated themselves as 'average'. No one (0%) has rated themselves as 'poor' in their comprehension and retrieval level.

Table 2*Descriptive Analysis of Students' Knowledge and Comprehension Level During Online Sessions*

	E	G	A	P	Overall		Male		Female	
	%	%	%	%	M	SD	M	SD	M	SD
Knowledge Level in Core Subjects	5.6	11.1	75.0	8.3	2.14	0.64	2.36	0.66	1.79	0.43
Comprehension and Retrieval Level	13.9	27.8	58.3	0.0	2.56	0.73	2.73	0.83	2.29	0.47

E-Excellent; G-Good; A-Average; P-Poor; M-Mean; SD-Standard Deviation

It is inferred from the data analysis, presented in Table 2, that majority of the students have found it difficult to understand the core subjects which underlines the need for improving the clarity of pedagogical design. Further, a significant percentage of students (M = 2.14) have self-rated their knowledge level as 'average' which suggests the necessity of approaches that foster understanding. Moreover, the students' self-perception of their knowledge level and comprehension and retrieval level (M = 2.56) also needs to be improved. Notably, the self-rating

of the knowledge level of the female students is very low ($M = 1.79$). This low self-rating could be indicative of their low self-efficacy. Self-efficacy refers to an individual's belief in his or her capacity to execute behaviours necessary to produce specific performance attainments (Bandura, 1977, 1997). Self-efficacy reflects confidence in the ability to exert control over one's own motivation, behaviour, and social environment. Thus, improving the self-efficacy of the students could enable them to acquire knowledge and comprehend the content more effectively.

Constraints in e-Learning

Aguilera-Hermida (2020) has stated that the “understanding of the challenges that students face and attitudes that they have in the higher education system could help the better preparation of learners for circumstances similar to COVID-19 in the future”. Firstly, when asked whether the students faced any constraint while attending online classes, 19.4% have said ‘always’, 44.4% have said ‘sometimes’, 30.6% have said ‘rarely’, and 5.6% have said ‘never’. The challenges faced by the students during online sessions include difficulty in understanding the language (47.2%), difficulty in understanding the content (47.2%), difficulty in understanding the context (22.2%), and not being able to see the mobile for a long time (2.8%). Regarding technical issues while attending their online classes, 8.3% have said ‘always’, 69.4% have said ‘sometimes’, 8.3% have said ‘rarely’, and 13.9% have said ‘never’. The technical difficulties are predominantly poor internet connectivity (47.2%), lack of a positive learning environment (41.7%), and lack of electronic gadgets to attend online classes (25%). Moreover, 2.8% said they are not interested in attending online sessions.

Table 3

Descriptive Analysis of Challenges Faced by Students During Online Sessions

	A	S	R	N	Overall		Male		Female	
	%	%	%	%	M	SD	M	SD	M	SD
Constraints	19.4	44.4	30.6	5.6	2.78	0.83	3.14	0.83	2.21	0.43
Technical Issues	8.3	69.4	8.3	13.9	2.72	0.81	2.86	0.83	2.50	0.76

A-Always; S-Sometimes; R-Rarely; N-Never; M-Mean; SD-Standard Deviation

The descriptive analysis of the data, presented in Table 3, exemplifies a wide extent of constraints faced by the students during their online sessions. Significantly, majority of students responded that they have been facing constraints ($M = 2.78$) and experiencing technical issues ($M = 2.78$) while attending the online sessions. The challenges faced by the students include difficulty in understanding the language, content, and context. This emphasises the cognitive barriers of the students. Technical difficulties hinder the quality of online education. In the case of online learning, the technical issues highlight the importance of bridging the discrepancy in access to digital tools and online resources for the establishment of equitable access to digital education and open learning. Moreover, this survey indicates gender variations in experiencing constraints

and technical issues while attending their online sessions. Male students ($M = 3.14$) have experienced significantly more constraints than female students ($M = 2.21$). Similarly, male students ($M = 2.86$) have reported facing relatively more technical issues than female students ($M = 2.50$). This may be due to the tendency of female students to observe keenly and apply their acquired skills in overcoming technical constraints. Consequently, the stereotypical notion that females are not proficient users of technology has been debunked.

Students' Motivation Level

Merisotis and Phipps (1999) stressed that “in e-learning, motivation is crucial because e-learning highly depends on independent learning, which needs self-direction, maturity, and self-control”. On enquiring whether the students feel less motivated while listening to lectures during their online classes, 33.3% have said ‘always’, another 33.3% have said ‘sometimes’, 22.2% have said ‘rarely’, and 11.1% have said ‘never’. When asked how often the students have been inclined to shift to other websites while their faculty members are handling the online classes, 11.1% have responded ‘always’, 69.4% have said ‘sometimes’, 5.6% have said ‘rarely’, and 13.9% have answered ‘never’. Regarding whether the students feel that online sessions are monotonous, as their faculty members are not able to have eye contact with them and hone their lectures accordingly, 25% have answered ‘always’, 55.6% have answered ‘sometimes’ 13.9% have said ‘rarely’, and 5.6% have said ‘never’. Pertaining to the students’ perception of the lack of cohort identity (sense of student belonging and engagement) during their online sessions, 22.2% have responded as ‘always’, 63.9% have said ‘sometimes’, 13.9% have said ‘rarely’, and none (0%) has said ‘never’. In the case of students finding it hard to stick to the study schedule during the online classes, 22.2% have answered ‘always’, 58.3% have said ‘sometimes’, 16.7% have responded ‘rarely’ and 2.8% have said ‘never’.

Table 4

Descriptive Analysis of Motivation Level among the Students During the Online Sessions

			A	S	R	N	Overall		Male		Female	
			%	%	%	%	M	SD	M	SD	M	SD
Students	Feel Less	Motivated	33.3	33.3	22.2	11.1	2.89	1.01	3.4	0.8	2.0	0.7
									1	0	7	3
Students	Shift to		11.1	69.4	5.6	13.9	2.78	0.83	2.9	0.7	2.5	0.8
	Other websites								5	9	0	5
Students	Feel		25.0	55.6	13.9	5.6	3.00	0.79	3.1	0.8	2.7	0.7
Sessions	are								4	3	9	0
	Monotonous											
Students	Feel a Lack		22.2	63.9	13.9	0.0	3.08	0.60	3.2	0.6	2.8	0.3
	of Cohort Identity								3	9	6	6

Students Finding it hard to stick to the study schedule	22.2	58.3	16.7	2.8	3.00	0.72	3.1	0.8	2.7	0.4
							4	3	9	3

A-Always; S-Sometimes; R-Rarely; N-Never; M-Mean; SD-Standard Deviation

The descriptive analysis of the data, delineated in Table 4, reveals that a substantial number of students ($M = 2.89$) feel less motivated while listening to their online lectures. This emphasises the anticipated challenge of fostering engagement during online lectures and the necessity of employing appropriate strategies to develop students' motivation in the e-learning setting. The tendency of students to shift to other websites during their online sessions ($M = 2.78$) could be suggestive of the decline in students' engagement during the virtual classes. Furthermore, the online sessions being monotonous due to the lack of eye contact between the students and teachers ($M = 3.00$) manifests as a motivational barrier for the students because it hinders the sense of connection with their faculty members. Similarly, the lack of cohort identity during the online sessions ($M = 3.08$) proposes a necessity for a positive classroom environment. Thus, effective strategies to improve the motivation and active participation of the students have to be devised. In this line, strategies like incorporating visually captivating content, enhancing team-based activities, and facilitating a constructive e-learning platform could be employed to sustain students' engagement and encourage interaction among them. Further, the students finding it difficult to stick to their study schedules ($M = 3.00$) reveals a lack of self-direction and initiative among the students which influences their motivation and engagement towards online learning. In this line, students must also be guided on effective time management strategies to overcome this constraint.

Furthermore, it could be observed that majority of the male students ($M = 3.41$) felt less motivated compared to the females ($M = 2.07$). There is also a marked discrepancy between the male and female students' levels in the other motivational aspects during their online sessions. This disparity could indicate that female students are more intrinsically motivated than male students. Intrinsic motivation is driven by enjoyment, interest, or satisfaction whereas extrinsic motivation is driven by obligation or responsibility. Intrinsic motivation is clearly superior to extrinsic motivation (Maslow, 1970), especially for long-term retention (Wu, 2003). The Self-Determination Theory (Deci & Ryan, 1985) posits that when support for the three basic needs - autonomy, competence, and relatedness - is available, learners will be intrinsically motivated to undertake the tasks. Therefore, steps should be taken to build learners' self-confidence and autonomy, increase learners' goal orientation, and develop a relationship with learners. The learning process should also be personalised by conducting activities that are relevant and appealing to students' interests.

Online vs Offline Sessions - A Comparative Analysis

The students' perceptions have been sought to compare the online sessions and offline sessions. Firstly, on enquiring whether the students find their offline sessions to be more interactive than the online classes, 27.8% have responded 'always', 47.2% have said 'sometimes', 22.2% have said 'rarely', and 2.8% have said 'never'. Next, when asked whether the students feel that offline learning helps them in grasping the subject knowledge better than online sessions, 22.2% have responded as 'always', 55.6% have answered 'sometimes', 8.3% have said 'rarely', and 13.9% have said 'never'. The result of academics is employability; pertaining to the perception of students on whether they feel that online sessions have decreased the chances of employability due to lack of exposure to the acquisition of generic skills, 30.6% have answered 'always', 61.1% have answered 'sometimes', 2.8% said have 'rarely' and 5.6% have said 'never'.

Table 5

Descriptive Analysis of Comparison between Online Sessions and Offline Sessions:

	A	S	R	N	Overall		Male		Female	
	%	%	%	%	M	SD	M	SD	M	SD
Offline sessions are more interactive	27.8	47.2	22.2	2.8	3.00	0.79	2.77	0.87	3.36	0.50
Offline learning helps in grasping subject knowledge better	22.2	55.6	8.3	13.9	2.86	0.93	2.64	1.09	3.21	0.43
Online sessions have decreased the chances of employability	30.6	61.1	2.8	5.6	3.17	0.74	3.18	0.91	3.14	0.36

A-Always; S-Sometimes; R-Rarely; N-Never; M-Mean; SD-Standard Deviation

The data pertaining to the comparison between online and offline sessions, compiled in Table 5, exemplifies a nuanced perception of the engaging nature and efficacy of the two modes of learning. A considerable number of students feel that offline sessions are better than online in terms of interaction (M = 3.00), knowledge acquisition (M = 2.86), and employability (M = 3.17). This underscores the complications of emulating the interpersonal relationships of traditional learning in the digital platform. Concurrent interactions and instantaneous feedback are possible in conventional classrooms, and they foster the holistic development of the students.

Notably, in spite of male students facing more constraints and technical issues and feeling less motivated during online sessions, female students are more favourable to offline learning than their male counterparts. This showcases the high preference and readiness for interaction in the classroom among female students. This has also been reiterated in this study, as female students have been asking doubts and handling presentations during online sessions more than male

students. Similarly, the perception of females that offline learning helps in grasping subject knowledge better ($M = 3.21$) in comparison to the males ($M = 2.64$) is reiterated by the female students' very low self-rating of knowledge level ($M = 1.79$) during online sessions (mentioned in Table 2). Further, the interrelation between educational accomplishments and employability is a vital factor. A significant number of students ($M = 3.17$) have felt that online sessions have decreased their chances of employability due to a lack of exposure to the acquisition of generic skills. Remarkably, the responses of the males ($M = 3.18$) and females ($M = 3.14$) do not show a significant difference in this aspect. This underlines the dire need for incorporating skill-based course content in the e-learning methodology and empowering students to be successful in their life and career.

RECOMMENDATIONS & CONCLUSION

Addressing the constraints and improving the efficacy of online learning would facilitate the smooth progress of HEIs towards digital learning. In this regard, the digital infrastructure of the institutes has to be developed. Digital equity and digital inclusion of the students should also be focused on, enabling access to digital tools and e-resources. The students of HEIs should have easy access to devices like desktops and laptops and sources of internet like LAN and wi-fi for them to have a better online learning experience. Similarly, digital literacy of the teachers and students should be developed, so as to facilitate effective use and incorporation of digital resources in the teaching and learning process. The increased use of video, audio, and visual images must be promoted to establish students' engagement and efficacy of online teaching. Thus, considerable training should be provided to teachers for incorporating multimedia elements in their teaching and making online classes more interactive for their students.

Adequate strategies have to be employed to enhance an interactive and participatory online learning environment such as encouraging students to ask questions, clarifying their doubts simultaneously, and increasing collaboration with various group activities. Moreover, faculty members should encourage their students to switch on their videos while attending online sessions to develop a sense of connection with the environment and cohort identity (a sense of belonging) in the online classroom. This would enable the students to feel safe, supported, and less anxious and so participate more in the online classroom. Besides, teachers should also foster students' creativity and critical thinking skills by conducting creative tasks and activities and giving challenging assignments. This would also help in developing students' engagement and motivation. Moreover, constructive feedback should be given to the students at the end of the tasks and activities for them to develop their skills. Similarly, discussions and reviews on the students' assignments should be provided systematically and periodically in the online sessions.

There is a need for fair online assessments for students in their digital learning environment. Assessments aid in determining the student's knowledge and skill level and communicating them to the stakeholders. Therefore, educators and policymakers must ensure the conduct of fair, reliable, valid, flexible, and transparent assessments in order to maintain the standards and quality of digital education. In this line, assessment tasks should move away from conventional and typical questions that test rote study and memorisation. Instead, assessments should focus on the

students' ability to utilise their acquired knowledge and skills in pragmatic and authentic situations.

In order to develop students' understanding level of the course content during online sessions, a focused teaching methodology should be implemented. The teachers should make conscious efforts to ensure that the content is delivered with clarity and at a comprehensible pace to the students. The students must also be provided with supplementary course materials. The recordings of the sessions could also be provided to the students for them to review at a later time. Self-assessment tools could be introduced to the students to aid their continuous evaluation and improve their comprehension and retrieval skills.

The students' self-direction, self-discipline, self-initiative, self-efficacy, and intrinsic motivation play a predominant role in effectuating online learning. Thus, these qualities should be instilled in the students for effective learning. Similarly, there is also a pressing need for imparting skills education to empower the students and improve their employability. Moreover, it is also significant to address the gender-based differences in the online learning environment. The teachers should take into account the diverse learning styles of the students and facilitate a collaborative online learning environment, accommodating gender differences and providing unbiased and inclusive digital education for the students.

The online teaching and learning experience during the pandemic has a transformative impact on the advancement of academia towards digital learning. In concordance, the paper has analysed the students' perception of the efficacy of online learning. The paper has also explored the constraints faced during the online sessions and recommended ways to overcome the challenges. Thus, this paper has provided insight into the effective implementation of online learning, eventually contributing to the development of a feasible and conducive environment for the implementation of digital learning.

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CHAPTER FIFTEEN

DIGITAL LEARNING IN INDIA: ISSUES AND OPPORTUNITIES

Savita Ranga

ABSTRACT

This article tries to explain the challenges and opportunities of the Digital Learning effect in the 21st century in India. Indian education influences many things, like population, poverty, teachers' skills, teaching methods, pedagogy, and finances. Digital learning is also one of the most effective ways of education. Digital learning is changing education into a new dimension. Education is the Nation's Strength. In India, education is conducted at different stages, such as primary, secondary, higher, and university. The Indian education system is the third largest in the world, first within the United States and the second in China. Since independence, India, as a developing nation, has been contentiously progressing in education. There are a lot of issues in India's education system that equally give a lot of opportunities to resolve these issues and to form education systems that provide far better education for the digital learning of the 21st century.

Keywords: 21st Century, Challenges, Education, Learning, Opportunities.

INTRODUCTION

Indian education influences many things, such as the population, poverty, teacher skills, teaching methods, pedagogy, and finances. According to the 2011 Indian Census reports, the population of India is 1,210,854,977, with 623,724,248 males and 586,469,174 females. The total literacy rate in the country at present is 74.04%. The present Indian population is more than 1.3 billion (www.census.co.in). India is geographically 7th largest country. There are so many religions and languages in India. Education is providing all children with a complicated process. So, the government provides education in all different ways. Learning is a lifelong process. Digital

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learning is a combination of content and methods. Electronic elements deliver it. Digital learning is one of the most effective ways of education. Digital learning is changing education into a new dimension (Marcum, 2014).

OBJECTIVES

- To know about education in India.
- To know about learning and digital learning.
- To know about the issues of digital learning.
- To know about the opportunities for digital learning.

EDUCATION IN INDIA

India's education system is the largest in the world. The school system in India has two levels – the primary level (lower primary age 6 to 10, upper primary age 11 and 12) and the secondary level (secondary age 13 to 15, higher secondary age 17 and 18 years). The lower primary school is divided into five “standards”: upper primary school into two, high school into three, and higher secondary into two. Students have to learn a standard curriculum largely (except for regional changes in their mother tongue) till the end of high school. There is some amount of specialisation possible at the higher secondary level. In the Indian education system, different types of schools exist, such as government schools, government-aided private schools, private schools (unaided), national schools, international schools, and home-schooling (www.wikipedia.org).

The next stage is at the college or university level. At this level, most of the administration is controlled by the University Grants Commission (UGC), which enforces its standards and advises the government. Accreditation for higher learning is overseen by 15 autonomous institutions established by the University Grants Commission (UGC) (www.wikipedia.org).

At the level of open and distance learning schools, the National Institute of Open Schooling (NIOS) provides opportunities for continuing education to those who missed completing school education. Fourteen lakh students are enrolled at the secondary and higher secondary level through open and distance learning. State governments also introduced the 2012 "State Open School" to provide distance education. Indira Gandhi National Open University (IGNOU) coordinates distance learning at the higher education level. It has a cumulative enrolment of more than 15 lakhs, serviced through 53 regional centres and 1,400 study centres with 25,000 counsellors. The Distance Education Council (DEC), an authority of IGNOU, coordinates 13 State Open Universities and 119 institutions of correspondence courses in conventional universities. These open and distance educational centres mainly maintain digital learning (www.wikipedia.org).

WHAT IS LEARNING?

Learning is the process of acquiring new understanding, knowledge, behaviours, skills, values, and preferences. Humans, animals, and some machines possess the ability to learn; there is also evidence of some learning in certain plants (Hayward, 2015).

Learning Factors: Learning factors are two types.

External factors mainly explain Heredity, the Status of students (Physical and home conditions), and the Physical environment.

Internal factors mainly explain goals or purposes, Motivational behaviour, Interest, Attention, Drill or practice, Aptitude, Attitude, Emotional conditions, Learning activities, Testing, and Guidance.

Learning Styles

Every individual is unique in the world. Everyone processes information at their own pace and in their way; researchers have discovered there are several types of learning styles or categories that everyone falls into:

Visual: Visual learners learn images or cues to help them process information. They have a good spatial sense and sense of direction, good colour balance, are good at using maps, and rarely get lost.

Auditory: Auditory learning is a unique learning style, but it is used to classify those who respond primarily to sound. Aural learners find that certain music invokes strong emotions and has a good sense of pitch or rhythm.

Linguistic: Linguistic learners learn best through verbal instruction and writing. They are typically interested in public speaking, writing, journalism, and debating. Linguistic learners enjoy reading and writing.

Physical: Physical learners like getting their hands dirty. They learn best by going through the motions of what they are learning. Physical learners enjoy sports and exercise, outdoor activities, and working with their hands.

Logical (Mathematical): Logical thinkers are mainly mathematicians, engineers, or scientists. Because they have a very unique way of learning. Logical learners classify and group information together to better understand it.

Interpersonal (Social): Interpersonal learners are natural group workers. Social learners prefer socialising after work or class and enjoy playing group sports (www.wikipedia.org).

Characteristics of Learning

- Learning involves change and activities.
- Learning requires interaction.
- Learning may be a lifelong process.
- Learning occurs randomly throughout life.
- Learning involves problem-solving and much more than thinking.
- Learning is a process of acquiring information.
- Experience is essential for learning (www.iedunote.com).

DIGITAL LEARNING

Digital learning may combine context and method with electronic elements. It is associated with technology and encompasses the application of a broad spectrum of practices, including virtual learning. Sometimes, digital learning is confused with online learning or e-learning, but it encompasses the concepts above (www.wikipedia.org).

Digital Learning Strategy:

- Adaptive learning and Blended learning
- Classroom technologies and E-textbooks
- Learning analytics and Learning objects
- Mobile learning: e.g., Mobile Phones, Laptops, Computers, iPads.
- Personalised learning
- E-learning or online learning and Open educational resources (OERs)
- Technology-enhanced teaching and learning

Digital Learning Pedagogies:

Listed below are common pedagogies, or practices of teaching, that combine technology and learning:

- Blended/hybrid learning
- Online learning
- Flipped learning
- Differentiated learning
- Individualised learning
- Personalised learning
- Universal Design for Learning (UDL)

Digital Learning Tools and Resources

There are a plethora of tools and resources online. This will create and enhance a digital learning environment. Listed below are resources and tools 21st-century teachers can use for digital learning:

- Google Classroom
- Easy class
- RSS or Social Readers
- Google+ Communities
- YouTube Channels
- iTunes
- Cloud-based Word Processors (i.e., Google Drive)
- File-sharing platforms (i.e., Dropbox)
- Evernote
- Digital Pocket
- Zotero

21st CENTURY DIGITAL EDUCATION IN INDIA

Indian education has changed in recent times. There was once a time when teacher-centred education was conducted; now, it has been changed to the student centre. Today, education is catching significant change from all segments of society (Malik, 2018). The world is changing. So, we understand what we are preparing for our children. 21st-century education deals with extraordinary change and can teach students (Humpl, 2022).

Modern technology in the learning program: Technology improves the interaction between communities and educationists' paper new methodologies and pedagogy. Technology makes learning natural and is the key to the future. It impacts interdisciplinary learning and research-based innovation. Digital classrooms, online learning, ICT tools, artificial intelligence, robotics, virtual reality, and so forth have revolutionised the education sector (Henderson, 2015).

Development of students' thinking skills: The student is the centre of education, which develops higher-order thinking skills in students.

Goal of modern education: Modern education aims to focus on ensuring that children are problem solvers, decision-makers, and enablers.

Skill-based education: Skill-based education is useful for students' future because it provides flexible learning paths and focuses on imparting life skills, using student-centric learning methods, and using technology.

Modern teaching methodology: Modern teaching methodology is focused on analytical and critical thinking skills. Students' transferable thinking skills and reflective observation help them develop their careers (Liu, 2018).

ISSUES WITH DIGITAL LEARNING IN INDIA

The following are the critical issues with digital learning in India:

1. Technology continuously changing: Unfortunately, technology is usually evolving, so you should not expect to use an equivalent tool forever. Instead, you should have an idea and budget for upgrading technology (Koryuhina, 2018).

2. Lack of quality content: With the quantity of digital content, it's overwhelming to curate a set of high-quality digital learning materials independently. Instead, your school administrators and teachers should work side-by-side with the varsity librarian to develop a solid collection of content.

3. High costs: Technology and digital resources are expensive. Therefore, teachers and schools should be prepared to hunt grants and community support for funding (Sleeman, 2016).

4. Security issues: More online activity creates more security issues. To combat these, your school should invest in security and teach students and teachers the fundamentals of internet safety (Martin, 2020).

5. Teacher skills: Teacher skills are most important in teaching-learning. Teacher training programs are useful for developing different methods for this process.

6. Digital classroom: One of the foremost challenges is digital classrooms in India because of poor internet connectivity, especially in rural areas and a couple of urban areas. The majority of the population across India still has no access to the internet, so maintaining digital classrooms is very problematic. An outsized population in rural areas remains illiterate, so we cannot use digital technology there.

7. Language and syllabus-related challenge: Language and Syllabus are among the foremost barriers to digital education in India. Different languages are spoken within the various states, making it difficult to quickly translate all the digital content into these regional languages and syllabuses.

8. Maintenance of digital equipment: In rural areas, maintaining digital equipment is one of the most challenging tasks.

9. Financing: Digital education involves effectively and efficiently using the latest hardware and software technology available in the market. Implementing digital technology into education systems in India could also be challenging. It requires significant funds and infrastructure. The government's Digital India program promises to provide funds for technology implementation (Sleeman, 2016).

OPPORTUNITIES OF DIGITAL LEARNING

Digital learning has plenty of advantages for teachers, students and administrators.

1. Recorded Lessons

One ample opportunity for digital learning is that some of your classes will be recorded—lessons will be recorded ahead of time. This implies that each lesson can be revisited as many times as needed. This is ideal if a student has questions or needs to review specific areas. As a result, an employee will have a more valuable experience (Mothibi, 2015).

2. Access on Demand

Digital learning is incredibly adaptable. Courses are available 24 hours. This means that teachings can be tailored to diverse working habits inside a company (Mirand, 2015).

3. Connected Learning

Another opportunity for digital learning is that you will be a member of a linked community. If you need assistance with something, tools like Zoom and Microsoft Teams can connect you with your classmates so you can get the answers you need right away.

And, while your professors will still have a schedule of classes to teach throughout the day, you won't have to wait until your next class to ask them questions, thanks to instant messaging services and email. Although they may not always be able to respond immediately, you will both have the opportunity to speak at times of the day that are convenient for you.

4. Digital Experiences

Digital experiences combine movies, content, questions, and even games. This training style engages and captivates users, ensuring the training is successful and enjoyable.

5. Self-Directed Learning

Self-directed learning is an essential component of higher education. It refers to time spent learning outside of class when one is not supervised by an instructor (Hung, 2010).

This time is critical because it allows you to discover your strengths and places where you may need to work a little more complicated. Although you will still have plenty of touch with your lecturers when studying online, there will be occasions when you will have to make an active decision to research and choose what to focus on for yourself. Taking care of your education in this way can be powerful, and it gives you a sense of self-confidence that will help you do even better in the future. University-level coursework also includes significant self-directed learning, making it an excellent preparation for your degree. Students can devote as much time as necessary to addressing their unique difficulties. They can also move on from a topic about which they are confident.

6. Flexible Choices

We now have an abundance of technology at our disposal, which is especially true when it comes to digital learning. You can mix and match the applications and software you use with various people and for different tasks (Kundi, 2014).

Even though your teacher always uses Zoom to broadcast lectures, when working on a group project with your classmates, you can experiment and find the mode of collaboration that works best for you, whether that's Zoom, Slack, Microsoft Teams, or WhatsApp!

7. Tracked Progress

Digital learning not only assists you in identifying your skills and shortcomings, but it also allows your teachers to track your development. They will have an immediately available online record of all your efforts and the ability to track your participation.

Your teacher, for example, will be able to notice if you attend all your seminars but do not contribute to some of them. That could be because you need help with the material, and they can reach out and offer assistance. They may even notice you have a problem before you do! (Means, 2009).

CONCLUSION

Finally, digital learning is the most effective form of education. 21st-century education is vital to a nation's development (Lechman, 2022). However, education is essential for growing our economy, society, and polity. 21st-century education in India has many challenges and opportunities. We want to speak about digital learning and highlight it so that the government can resolve such issues. You would like to read this text to urge thoughts about ways to overcome digital learning. 21st-century opportunities are available, but the way to benefit from them and make them accessible to others may be a matter of concern (www.hindustantimes.com). Digital classrooms, online classes, and ICT tools are developing education for better opportunities (Suleiman, 2020)).

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CHAPTER SIXTEEN

BLENDED LEARNING APPROACH: TEACHERS' PERCEPTION AND PEDAGOGICAL INTERVENTIONS IN DIGITAL LEARNING

Sheela Anand and Sapna Suman

ABSTRACT

Technology integration in education has transformed traditional classrooms, leading to blended learning approaches that combine face-to-face instruction with digital tools and resources. It offers students and teachers a more flexible and practical teaching-learning experience. However, before implementing this pedagogical intervention, it is essential to assess the teachers' perception towards it. Hence, this paper aims to study the perception and readiness of school teachers towards a blended learning approach. A descriptive survey method has been employed to collect the relevant data. The middle-stage and secondary-stage school teachers of Patna, Bihar, have been taken as the sample for the study. A self-constructed five-point rating scale has been used to study the perception and readiness of the teachers toward a blended learning approach. The study reveals that the teachers have a favourable attitude towards blended learning. However, they have concerns regarding technology integration, professional development, and proper training in digital skills to adapt to blended learning efficiently. Understanding this pedagogical intervention can provide valuable insights for educational institutions and policymakers seeking to promote effective blended learning practices.

Keywords: Blended Learning, Perception of Teachers, Digital Learning, Digital Skills, Pedagogical Interventions

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INTRODUCTION

"Teachers are the architects of learning, and technology is the tool that helps build the bridge between traditional and modern education."

Today, power comes from knowledge, and education is the key to acquiring it. Education makes a significant contribution to pupils' overall growth. Teachers significantly impact students throughout their formative years, regarded as the most critical time in a person's life. The institution's efficacy may affect the child's educational experience as a student (Rajram, 2014). In the sphere of education, there has been a paradigm change from teacher-centric to learner-centric classroom instruction. This fresh paradigm change brought about the effective use of ICT in teaching and learning. The integration of digital technology and ICT inside the education system has been aggressively supported by several committees and commissions in India to improve the efficacy of the education system.

A teacher must develop a set of abilities, knowledge, and attitudes known as "digital competence" to integrate information and technology into the classroom in a technical, pedagogical, and didactic manner. (Cabero, 2021). The author highlights the connection between curriculum, pedagogy, and schools via digital information to promote children's social and emotional development. Teachers play a critical role in the successful communication of their experiences in the classroom and need professional development in digital skills. (Cathy Burnett, 2016)

Technology in education has fundamentally altered conventional classroom environments and sparked a shift toward blended learning strategies that use digital resources and educational technology. The idea that learning is a continuous process rather than a one-time event is the basis of blended learning (Garrison & Kanuka, 2004). Digital technology stimulates creativity and promotes innovation. By using digital tools in the classroom, educators and students may acquire new information, abilities, and experiences. (Demir & Akpinar, 2018)

Redesigning India's educational system is the aim of NEP 2020, which will highlight a substantial change in the direction of online and mixed learning. All educational levels should use online and blended learning materials with traditional teaching. According to the policy, this new way of learning is the need of the hour. To successfully educate their pupils and prepare them

In the future, instructors must have the necessary skills and a good attitude when using digital tools. Blended learning integrates traditional teaching methods with online resources to enhance the learning experience. It's an innovative approach with great potential to deliver quality education to children by recognising that learning is an ongoing, dynamic process rather than a one-time event. This kind of teaching aims to combine conventional classroom techniques with various online learning materials and opportunities for online participation. (Lalima & Dangwal, 2017). The author found in his study that integrating technology in classrooms promoted active learning and enhanced student autonomy through increased opportunities for reviewing and reinforcing conceptual understanding (Ramaila & Anwar,

2022). It is crucial to consider the teacher's role in the mixed-learning setting. The instructor should take on the role of a facilitator or guide, emphasising student-centred application.

SIGNIFICANCE OF THE STUDY

Every facet of human existence, including education and learning, has been impacted by digitalisation. Its substantial potential lies in enhancing the quality of education within schools. Consequently, contemporary educators must possess a deep understanding of content and pedagogical and technological expertise. This multifaceted knowledge equips them to impart information to students in a more advanced and effective manner. Due to various issues, the blended learning approach demands some skills and a favourable attitude from teachers who face many challenges in incorporating it into their day-to-day teaching-learning process. Hence, it is essential to study teachers' perceptions of blended learning and how this new approach is a pedagogical intervention in digital education.

OBJECTIVES

1. To study the perception of teachers towards blended learning.
2. To find the significant difference in the mean score of the perceptions of school teachers towards blended learning with respect to age.
3. To find the significant difference in the mean score of the perception of schoolteachers towards blended learning based on the school type.

NULL HYPOTHESIS

1. There is no significant difference in the mean score of school teachers' perceptions towards blended learning with respect to their age.
2. There is no significant difference in the mean score of school teachers' perceptions towards blended learning with respect to the type of school.

METHODOLOGY

Method: A descriptive survey method was used to collect the relevant data.

Population and sample: This study's population consisted of school teachers in Patna, Bihar. The sample consisted of 124 middle-stage and high school teachers who taught in government, private, and missionary schools.

Distribution of Sample School-Wise

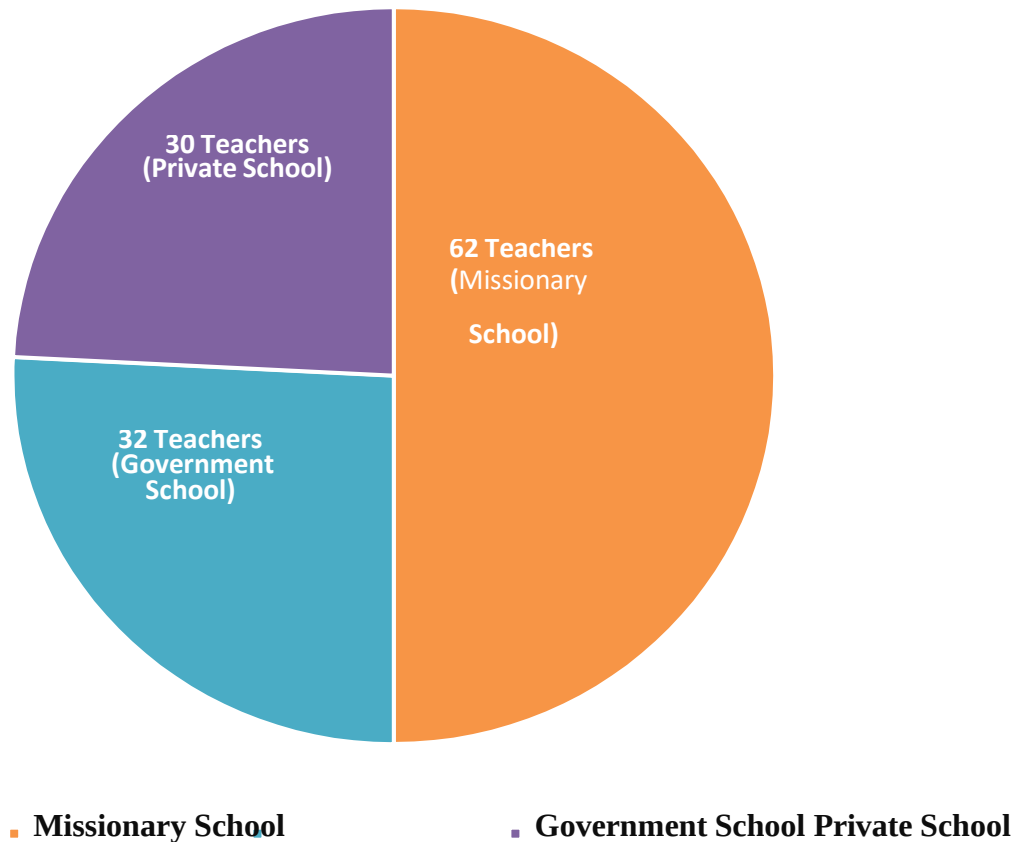


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Research Tool

A self-constructed five-point rating scale of 53 items on different dimensions of blended learning in teaching-learning has been used to study teachers' perceptions and readiness for this approach.

The tool also incorporated open-ended questions to help school teachers understand the issues they may have regarding the integration of technology into the teaching-learning process.

Statistical Techniques

Statistical techniques, such as percentage analysis, mean, standard deviation, and ANOVA, were used to analyse data using SPSS software.

RESULTS AND DISCUSSION

Table 1: Percentage Analysis of School Teachers' Perceptions Towards Blended Learning.

Perception Level of School Teachers towards Blended-Learning	No. of School Teachers	High	Moderate	Low
	124	13 (10.49%)	92 (74.19%)	19 (15.32%)

The data in Table 1 indicate that 10.49% of school teachers have a high perception of blended learning, while 15.32% have a low perception. Notably, 74.19% have a moderate perception of its utilisation.

Hypothesis No: 1 There is no significant difference in the mean score of school teachers' Perceptions towards blended learning with respect to their age

Table 2: Significant Differences In The Perception Of School Teachers Towards Blended Learning With Respect To Age.

Age Group	No. of Teachers	Mean	S.D		
Below 30yrs	19	173.8947	22.54845		
B/W 30- 45yrs	54	167.5741	14.08546		
Above 45yrs	51	171.7843	20.22046		
One-way ANOVA with respect to the age of school teachers					
Perception towards Blended Learning	Sum of Squares	df	Mean Square	F-ratio	Significance
Between Groups	759.057	2	379.528	1.45	0.322
Within Groups	40117.621	121	331.551		Not significant
Total	40876.677	123			

(The table value of 'F' is significant for $\alpha \leq 0.05$)

In Table 2, the F-ratio is 1.45, which is less than the table value of F (3.07), which shows that it is not significant. Hence, the null hypothesis is accepted, which means that there is no significant difference in the mean score of the teachers' perception towards blended learning with respect to age. Teachers under 30, between 30 and 45, and even those above 45 have similar perceptions of blended learning.

Hypothesis No.: 2 There is no significant difference in the mean score of school teachers' Perceptions towards blended learning with respect to the school types

Table 3(a): Significant difference in the mean score of schoolteachers' perception towards blended learning with respect to the school type.

Type of school	No. of Teachers	Mean	S.D		
Private	30	173.133	19.41157		
Government	32	161.5938	15.45829		
Missionary	62	173.371	17.78306		
One-way ANOVA with respect to type of school					
Perception	Sum of Squares	df	Mean Square	F-ratio	Significance
Between groups	3251.024	2	1625.512	5.227	.007 Sig
Within groups	37625.653	121	310.956		
Total	40876.653	123			

(The table value of 'F' is significant for $\alpha \leq 0.05$)

Table 3(b): Post Hoc analysis results related to the perception of schoolteacher towards blended learning with respect to the school types

School (I)	School (J)	Mean Difference (I-J)	Std. Error	Significant
Private	Government	11.540	4.481	.040
	Missionary	.238	3.922	.998
Govt	Private	11.540	4.481	.040
	Missionary	11.777	3.838	.011
Missionary	Private	.238	3.922	.998
	Govt	11.777	3.838	.011

Table (3b) shows that the F-ratio is. 5.227 and sig. (α) is .007 for the above analysis of variance for the perception of schoolteachers with respect to the school type. Accordingly, the null hypothesis is not accepted because there is a significant difference between the mean score of the perception of schoolteachers based on the school types. Since the result has been significant, post hoc analysis has been conducted, and the results revealed that there is a significant difference in the perception of private and government schoolteachers towards

blended learning. Also, a significant difference was found in the perception of missionary and government schoolteachers toward blended learning. The perception of private and missionary schoolteachers was more favourable toward blended learning than government school teachers.

RECOMMENDATIONS/SUGGESTION

The school teacher gave the following suggestions for the implementation of blended learning approaches and pedagogical interventions in digital learning:

- Regular workshops and seminars to upgrade their digital skills and technology integration in teaching-learning.
- Short-term courses on professional development and proper training to adapt blended learning efficiently.
- Digital tools and resources should be provided to implement blended learning better in their teaching-learning process.
- Institutional support for integration of technology in the teaching-learning process.

CONCLUSION

Technology helps improve education, which defines a nation's destiny in the digital age. A popular educational method, blended learning, blends fundamental skills and models to prepare students for the 21st century. Using digital skills and e-tools in education may improve student understanding and learning. From the results of the study, it was found that age is not a barrier to using blended learning approaches. Most teachers have accepted that blended learning has become an integral part of the teaching-learning process. However, it is seen that some teachers, especially those teaching in government schools, still need to become more comfortable with blended learning approaches. Technology can only partially replace teachers. Implementing blended learning strategically necessitates educators to use blended learning to empower teachers by precisely choosing and using tools at the right moments.

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CHAPTER SEVENTEEN

RESEARCH TRENDS IN OPEN AND DIGITAL LEARNING IN INDIA: A COMPREHENSIVE EXAMINATION OF KEY AREAS AND FUTURE PROSPECTS

Shubha Sarkar

ABSTRACT

Open and digital learning have become pivotal in India, revolutionising the education landscape. This paper provides an overview of research trends in open and digital learning within India, tracing their evolution, examining their implications for the Indian education system, and addressing challenges and opportunities faced by researchers and educators in this dynamic field. Key research areas include open educational resources (OER), massive open online courses (MOOCs), digital tools, and emerging technologies. Through in-depth analysis, this paper offers insights into the current state and future directions of open and digital learning in the Indian educational context.

Keywords: Open Educational Resources, MOOCs, Digital Learning, Emerging Technologies, Research Trends

INTRODUCTION

In the vast expanse of India, where a colossal and diverse population is entwined with an escalating thirst for education, open and digital learning has emerged as a distinctive and dynamic crucible. Within this crucible, a remarkable proliferation of open educational resources (OER), massive open online courses (MOOCs), cutting-edge digital tools, and avant-garde emerging technologies has given rise to a transformative shift, reshaping the contours of the country's educational landscape. This paper embarks on a meticulous exploration, dissecting the pivotal research trends that guide open and digital learning in India, unravelling their profound significance and delineating their far-reaching impact.

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As open and digital learning rapidly integrates into the nation's educational fabric, traditional paradigms undergo a significant metamorphosis. This paradigm shift lays the foundation for a comprehensive investigation into the research trends steering this transformative domain. This introductory section serves as a contextual backdrop, delving into the historical roots of education in India and accentuating the imperative for innovative approaches to cater to the burgeoning population and diverse learning needs.

The unique tapestry of India's educational journey becomes the canvas upon which this exploration unfolds, emphasising the pressing need for transformative measures. The symbiotic interplay of historical context and contemporary demands provides the setting for a nuanced examination of the multifaceted dimensions that define the open and digital learning landscape in this vibrant nation.

BACKGROUND OF THE STUDY:

In the vast shade of India's educational landscape, this paper delves into the intricate historical roots, recognising the ever-evolving nature of education in this diverse nation. A nuanced examination of the historical context of education unfolds, shedding light on the pressing need for innovative approaches to address the population's multifaceted and burgeoning educational needs comprehensively.

The historical backdrop encompasses a rich tapestry of educational traditions, reflecting India's cultural, linguistic, and regional diversity. From ancient learning centres to the advent of formalised education systems, the evolution has been marked by a dynamic interplay of tradition and adaptation. As India continues to grapple with the challenges of its colossal and diverse population, the historical context underscores the necessity for transformative methodologies to meet its people's evolving educational requirements.

The imperative for innovation in educational approaches becomes even more pronounced in the face of contemporary challenges such as increasing urbanisation, technological advancements, and the demand for a more inclusive and accessible education. The historical exploration not only serves as a foundation for understanding the roots of education in India but also sets the stage for the pivotal role of open and digital learning in shaping the future trajectory of the nation's educational journey.

Against this historical backdrop, exploring research trends in open and digital learning takes on added significance. It positions itself as a response to evolving educational needs and acknowledges the transformative potential of innovative educational paradigms. Therefore, the historical underpinnings of education in India serve as a backdrop against which the dynamic shifts towards open and digital learning can be comprehensively examined, understood, and charted for the future.

SIGNIFICANCE OF OPEN AND DIGITAL LEARNING

This research on the trends in open and digital learning in India holds paramount significance as it intricately examines the pivotal role of open and digital learning methodologies in effectively addressing multifaceted challenges within the Indian education system. The study illuminates the transformative potential inherent in technology-driven solutions by delving into the intricacies of access, inclusivity, and quality. The findings underscore the pressing need for adapting traditional pedagogical approaches to align with the ever-evolving needs of the diverse learner demographic in India, marking a critical juncture in the ongoing discourse on educational reform.

The study goes beyond mere exploration into a comprehensive analysis, shedding light on the nuanced dimensions of open and digital learning. By scrutinising the challenges related to access, the research aims to contribute substantively to the ongoing conversation surrounding educational equity, particularly in a populous and diverse nation like India. Examining inclusivity factors delves into the critical importance of ensuring that educational opportunities are accessible to learners across varying linguistic, cultural, and socio-economic backgrounds.

Moreover, the study accentuates the quality aspect of education, recognising the transformative potential of technology-driven solutions. It underscores the urgency for educators and policymakers to embrace innovative approaches that leverage digital tools to enhance the quality of educational delivery. This is not merely an exploration of trends; it is a clarion call for educational stakeholders to proactively adapt to the changing landscape and adopt strategies that ensure a high standard of education for all.

The study emphasises technology's transformative potential, which resonates with the evolving nature of educational methodologies. It underscores the need for a paradigm shift in pedagogical approaches and emphasises technology's role as a catalyst for change. It portrays technology not merely as a facilitator but as a revolutionary force capable of reshaping the traditional contours of education. This recognition of technology as a transformative agent adds depth to the study, positioning it at the forefront of discussions on the future trajectory of education in India.

In essence, this study's significance extends far beyond merely exploring research trends; it serves as a clarion call for action, advocating for a paradigm shift in the approach to education in India. By addressing access, inclusivity, and quality challenges, the study contributes meaningfully to the ongoing narrative on educational reform. It underscores the indispensable role of open and digital learning in shaping the future of education in India's dynamic landscape.

OBJECTIVES OF THE STUDY

This paper endeavours to thoroughly explore the multifaceted dimensions of open and digital learning in India. The specific objectives include:

1. Examination of Key Research Trends: Analyse current and emerging research trends in open and digital learning by scrutinising scholarly articles, papers, conferences, and books. Identify cutting-edge developments, theoretical frameworks, and novel concepts shaping the field.

2. Evaluation of Implications for the Indian Education System: Evaluate the impact of open and digital learning trends on the education system, considering transformative effects, benefits, and challenges. Focus on changes in curricular design, pedagogical approaches, and overall educational outcomes.

3. Identification and Analysis of Challenges Faced by Educators and Researchers: Examine challenges educators and researchers face in Indian open and digital learning. It analyses tech limitations, pedagogical dilemmas, and socio-economic gaps, offering insights into obstacles hindering innovative education.

4. Exploration of Opportunities for Further Advancements: Identify areas for innovative practices, policies, and technology interventions to advance open and digital learning. Contribute valuable insights to guide educators, policymakers, and researchers in fostering meaningful advancements in digital education in India.

5. Examination of Socio-economic Impacts: Analyse how open and digital learning affect socio-economic factors like employment, income, and societal development, revealing their role in shaping India's socio-economic landscape.

6. Investigation of Technological Infrastructure Challenges: Explore technological challenges in open and digital learning implementation, focusing on internet accessibility, device availability, and regional resource disparities in India. The study aims to inform policies for fostering equal access to digital education.

7. In-depth Analysis of Learning Outcomes: Analyse the learning outcomes of open and digital learning and evaluate their effectiveness in boosting engagement, knowledge acquisition, and skill development. This study aims to offer insights into the pedagogical efficacy of these methodologies.

8. Exploration of Cross-disciplinary Collaborations: Explore cross-disciplinary collaborations in open and digital learning. Integrate education, technology, psychology, and sociology insights to create effective educational interventions. Promote interdisciplinary collaboration to understand factors in India's open and digital learning comprehensively.

METHODOLOGY OF THE STUDY

The research methodology employed in this comprehensive exploration of research trends in open and digital learning in India is designed to ensure rigour, depth, and relevance. The multifaceted nature of the study requires a combination of qualitative and quantitative research methods, incorporating both primary and secondary data sources. The following sections outline the key components of the research methodology:

1. Literature Review: The literature review is foundational, encompassing scholarly works on Indian open and digital learning. It offers insights into historical evolution, current state, and emerging trends, shaping research questions through theoretical frameworks and critical findings.

2. Case Studies: Conducting detailed case studies, we explore specific instances of open and digital learning in India, focusing on institutions, government initiatives, and innovative projects. These studies offer insights into best practices and unique challenges, gathering qualitative data through interviews with educators, administrators, and policymakers for a rich contextual understanding of learning adoption.

3. Surveys and Questionnaires: Quantitative data is gathered via surveys and questionnaires distributed to educators, students, and administrators across diverse educational levels. These surveys capture insights on OER, MOOCs, digital tools, and emerging technologies. Statistical analysis of survey data helps identify prevalent trends, preferences, and challenges in the Indian education landscape.

4. Interviews: Structured interviews with government officials, policymakers, tech experts, and industry professionals gather qualitative insights, complementing quantitative data. These interviews offer a holistic perspective, validating and triangulating information from various sources.

5. Content Analysis: This method systematically analyses textual data from diverse sources like policy documents and research publications, identifying key themes and trends in open and digital learning. Content analysis illuminates 'discourses in the field and is valuable for understanding policy landscapes and institutional practices.

6. Comparative Analysis: Evaluating diverse open and digital learning initiatives in India involves comparing their effectiveness, challenges, and outcomes. By scrutinising data from various sources, including different educational settings, regions, and socio-economic contexts, this approach unveils variations and commonalities, providing a nuanced understanding of their diverse impacts.

7. Ethical Considerations: Ethics are paramount in our research. We secure informed consent from interviewees, survey participants, and case study subjects. Ensuring anonymity and confidentiality, we handle sensitive information following ethical guidelines. Upholding principles of integrity and respect, our research maintains transparency in reporting findings.

THE MAJOR FINDINGS OF THE STUDY

The comprehensive exploration of research trends in open and digital learning in India has unearthed multifaceted dimensions, offering valuable insights into the present state and prospects of the educational landscape. The synthesis of diverse research endeavours across key areas has paved the way for a nuanced understanding of the challenges, opportunities, and transformative potential inherent in open and digital learning.

1. Open Educational Resources (OER): This section delves into the critical role of OER in fostering inclusivity and localised learning of the Indian education system, sparking research endeavours that delve into various critical dimensions:

- **Adaptation and Localization (Agarwal, 2019):** Investigating the nuanced adaptation of OER to cater to the linguistic and cultural diversity of Indian learners and scrutinising the effectiveness of locally produced OER in regional languages and their impact on learning outcomes.
- **Accessibility and Equity (Pande, 2019):** Assessing the catalytic role of OER in bridging educational disparities, amplifying access to quality education and delving into government initiatives aimed at propelling OER adoption in schools and universities, thereby fostering inclusivity.
- **Teacher Professional Development (Balaji & Chakraborty, 2017):** Exploring the transformative impact of OER on teacher professional development and analysing the integration of OER into teacher education programs and its implications for pedagogical practices.

2. Massive Open Online Courses (MOOCs): Revolutionizing Higher Education MOOCs, heralded as a scalable and affordable means of education in India, have spurred research across various domains:

- **Higher Education Transformation (Jyoti & Sarkar, 2018):** Investigating the catalytic role of MOOCs in reshaping higher education, including their impact on curriculum design and pedagogical approaches. - Evaluating the challenges and opportunities presented by integrating MOOCs into the higher education landscape.
- **Skills Development and Employability (Sharma & Maitra, 2019):** Analysing the alignment of MOOCs with the dynamic needs of the job market in India and exploring the effectiveness of MOOCs in cultivating and enhancing employability skills among learners.
- **Blended Learning (Jyoti & Sarkar, 2018):** Studying the seamless integration of MOOCs into traditional classroom settings and analysing the potential for hybrid learning models, blending digital and conventional approaches, in Indian educational institutions.

3. Digital Tools and Platforms: Catalysts for Innovation: the advent of digital tools and platforms has ushered in innovative teaching and learning experiences, giving rise to key research areas:

a) Learning Management Systems (LMS) (Ravindran et al., 2020): Evaluating the utilisation of LMS in Indian educational institutions, gauging their impact on administrative processes and educational delivery. - Exploring challenges and opportunities associated with adopting LMS, considering factors such as infrastructure and pedagogical practices.

b) Mobile Learning (Punia et al., 2017): Investigating the transformative impact of mobile devices in expanding access to education across diverse socio-economic strata and analysing the role of mobile apps in delivering educational content and their effectiveness in enhancing the learning experience.

4. Emerging Technologies: A Glimpse into the Future of Indian Education Advancements in technology, such as artificial intelligence and virtual reality, are reshaping Indian education, prompting research trends to unfold:

- **Adaptive Learning** (Bhat & Bansal, 2021): This explores the landscape of AI-driven adaptive learning platforms in the Indian educational context. It assesses the efficacy of these platforms in personalizing learning experiences and improving learning outcomes.
- **Virtual Laboratories** (Kumar & Abhilasha, 2020): This investigates the application of virtual labs in science and engineering. Education, addressing resource constraints and analysing the potential of virtual laboratories to provide immersive and hands-on learning experiences.

5. Challenges and Future Directions: Navigating the Educational Landscape, Despite the remarkable strides in open and digital learning, India faces persistent challenges, setting the stage for future research directions:

- **Digital Inclusion** (Kaur & Singh, 2019): Studying strategies to bridge the digital divide and ensure universal access to digital learning resources for learners across diverse backgrounds.
- **Quality Assurance** (Kaur & Singh, 2019): Exploring robust mechanisms for ensuring the quality and accreditation of digital learning programs. - Investigating frameworks that uphold standards and benchmarks in the ever-evolving digital education landscape.
- **Policy and Regulation** (Kaur & Singh, 2019): Analysing the role of government policies in propelling the adoption and regulation of digital learning. - Investigating the evolving regulatory frameworks for digital education in India, ensuring a balance between innovation and quality assurance.

FUTURE RESEARCH DIRECTIONS

The paper articulates potential avenues for future research in open and digital learning in India, considering emerging technologies, evolving educational needs, and the changing socio-economic landscape.

1. Integration of Emerging Technologies: Investigate the integration of AI, AR, and blockchain in digital education. Explore the benefits, challenges, and innovative applications for enhanced learning.

2. Personalized Learning Pathways: Explore personalised learning paths using advanced analytics and adaptive systems to enhance educational outcomes for diverse learners.

3. Gamification in Education: Study how gamification elements in digital learning enhance engagement, motivation, and outcomes and assess their impact on student participation and retention.

4. Cybersecurity in Digital Learning: To enhance digital learning security, Focus on developing strong measures, protocols, and awareness initiatives to safeguard educational data and ensure online learning integrity amid rising cybersecurity concerns.

5. Long-Term Impact Assessment: Propose longitudinal studies to assess the long-term impact of open and digital learning initiatives on learners' academic and professional trajectories. Explore how these initiatives contribute to lifelong learning, skill development, and career advancement.

6. Community Engagement and Outreach: Explore ways to connect open and digital learning with communities. Study how outreach programs can narrow the urban-rural education gap, encourage community-based learning, and empower marginalised groups.

7. Ethical Considerations in Educational Technology: This section explores the ethics of educational technology, examining concerns related to data privacy, algorithmic decision-making, and the use of emerging technologies in education.

8. Cross-disciplinary Collaboration: Encourage diverse collaborations among educators, technologists, psychologists, and sociologists to gain a holistic understanding of open and digital learning's impact and foster more effective educational interventions.

CONCLUSION

The research paper highlights critical insights into the evolving role of open and digital learning in reshaping the educational landscape in India. This transformation has been propelled by significant technological advancements and progressive educational reforms, which are crucial to addressing the diverse needs of learners nationwide. As these learning modalities continue to develop, research stands as a fundamental pillar, ensuring that these innovations align effectively with the population's educational needs.

The study underscores the necessity for ongoing research and innovation within this dynamic field to tackle emerging challenges, promote equitable access to education, and cultivate a culture of continuous improvement. It emphasises that as India further integrates open and digital learning into its educational framework, the sustained focus on research will be crucial for enhancing and refining these educational practices.

Moreover, the collaborative efforts of researchers, educators, and policymakers are essential to advance the trajectory of open and digital learning. Such partnerships are vital for ensuring that

the potential of digital and open learning is fully realised, ultimately fostering an inclusive and progressive educational environment in India.

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CHAPTER EIGHTEEN

OPEN AND DIGITAL LEARNING INITIATIVES SHAPING EDUCATION IN INDIA

Sonika Devi and Nishta Rana

ABSTRACT

The present status of open and digital learning in India reflects the country's dynamic educational landscape, characterised by a growing emphasis on leveraging digital technologies to foster inclusive and accessible learning opportunities. This paper delves into an exploration of the current state of open and digital learning initiatives in India, highlighting the multifaceted developments and transformative initiatives that have shaped the educational paradigm in the country. It examines the widespread adoption of online learning platforms, the proliferation of open educational resources, and the integration of digital tools and technologies in academic delivery and pedagogical practices. Additionally, the paper addresses the challenges and opportunities associated with implementing open and digital learning in the Indian context, emphasising the need to bridge the digital divide, promote digital literacy, and ensure equitable access to quality education for diverse learner communities nationwide. This paper aims to provide a comprehensive overview of the present status of open and digital learning in India, offering insights into the transformative potential of these initiatives in fostering a culture of lifelong learning and skill development in the digital era.

Keywords: National Digital Literacy Mission and Digital India, Massive Open Online Courses (MOOCs), IGNOU, SWAYAM.

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INTRODUCTION

Digital learning refers to any teaching that uses and takes advantage of technology. So, digital learning covers anything that includes learners using digital platforms, resources, systems & apps (Escuadro, 2022). In the vibrant tapestry of India's educational landscape, Open and Digital Learning Initiatives have emerged as transformative catalysts, reshaping learning contours. With a diverse population and varying accessibility to traditional educational avenues, these initiatives play a pivotal role in democratising education. Embracing technological advancements, India's educational ecosystem is witnessing a paradigm shift, breaking geographical barriers and fostering inclusivity. Rapid technological developments have made distance education easy (McBrien et al., 2009). “Most of the terms (online learning, open learning, web-based learning, computer-mediated learning, blended learning, m-learning, for ex.) have in common the ability to use a computer connected to a network, that offers the possibility to learn from anywhere, anytime, in any rhythm, with any means” (Cojocariu et al., 2014).

Open Learning, characterised by flexible curriculum structures and distance education, enables learners across urban and rural landscapes to pursue education at their own pace. Simultaneously, Digital Learning Initiatives leverage the power of technology to deliver engaging content, interactive tools, and collaborative platforms. This marriage of openness and digitalisation accommodates diverse learning styles and aligns seamlessly with India's quest for educational equity.

As one delves into the intricate threads of these initiatives, this exploration aims to unravel their impact, challenges, and the promising trajectory they chart for the future of education in India.

WHAT IS OPEN AND DIGITAL LEARNING?

Digital learning refers to any learning that uses and takes advantage of technology. So, digital learning covers anything that includes learners using digital platforms, resources, systems, and apps. This can involve taking online classes, researching on Google, watching online videos, and using digital tools during face-to-face training sessions. It also allows learners to access expertly designed courses and training materials anytime and anywhere. Digital learning courses are usually far more interactive and engaging, thanks to mobile learning, active learning, and gamification (Escuadro, 2022).

OPEN AND DIGITAL LEARNING INITIATIVES IN INDIA

- **SWAYAM (Study Webs of Active Learning for Young Aspiring Minds):**

SWAYAM(Study Webs of Active-Learning for Young Aspiring Minds) is an Indian online learning portal for MOOC (Massive open online course) platform. The SWAYAM initiative was launched by the Ministry of Human Resource Development (MHRD). The Government of India has been moving towards Digital India, and to revolutionise the education sector, the SWAYAM initiative was launched, which provides free access to web courses. SWAYAM was launched on 9th July 2017 by Ram Nath Govind, Honourable President of India. SWAYAM is equipped with

2,000 courses, partnering institutes (203), no. of completed courses (7042), no. of student enrolment (27190053), no. of exam registrations (1604055), and no. of successful certificates (1113399) as on 30th April 2022 (Manickam, 2023). The platform's expansive course catalogue caters to a wide range of academic interests, fostering a culture of continuous learning. SWAYAM embodies the government's vision of democratising education, breaking down barriers to knowledge acquisition, and nurturing the intellectual growth of young minds at various educational stages. In essence, it symbolises a transformative approach to education, transcending traditional boundaries and embracing the potential of technology for widespread educational empowerment.

- **NPTEL (National Programme on Technology Enhanced Learning):**

NPTEL, the National Programme on Technology Enhanced Learning, is a collaborative effort by prestigious institutions such as IITs (Indian Institutes of Technology) and IISc (Indian Institute of Science). This initiative pioneers online courses in engineering and sciences, embodying a commitment to advancing technical education through digital platforms (Ananth, 2011). With a focus on leveraging technology for educational enrichment, NPTEL plays a pivotal role in democratising access to quality learning resources. The courses cover a broad spectrum of engineering and scientific disciplines, providing a flexible and accessible avenue for learners worldwide. NPTEL's significance lies in its ability to bridge geographical gaps and empower individuals with the knowledge and skills necessary for success in the ever-evolving realms of technology and science. Through this collaborative venture, NPTEL continues to contribute significantly to the global landscape of digital education.

- **e-Pathshala:**

The e-Pathshala, a joint initiative of the Ministry of Education, Govt. of India and National Council of Educational Research and Training (NCERT), has been developed for showcasing and disseminating all educational e-resources, including textbooks, audio, video, periodicals, and a variety of other print and non-print materials for Students, Teachers, Parents, researchers and educators (MoE). e-Pathshala serves as a comprehensive educational platform designed to enhance the learning experience for school students. Functioning as a digital textbook and educational material portal, it offers diverse resources to supplement traditional learning methods. With a primary goal of enriching education, e-Pathshala provides interactive digital materials beyond conventional textbooks. This innovative approach aims to engage students in a dynamic and immersive learning environment, fostering a deeper understanding of academic subjects. By seamlessly integrating technology into education, e-Pathshala empowers students with resources catering to various learning styles, promoting accessibility and effectiveness. Whether through multimedia presentations, interactive quizzes, or visually engaging content, the platform aligns with the evolving landscape of education, recognising the importance of digital tools in facilitating a more holistic and engaging learning process for students in schools.

- **DIKSHA (Digital Infrastructure for Knowledge Sharing):**

DIKSHA (Digital Infrastructure for Knowledge Sharing) is a national platform for school education, an initiative of the National Council for Education Research and Training (NCERT), under the aegis of the Department of School Education and Literacy (DoSE&L), Ministry of Education (MoE). DIKSHA was developed based on the core principles of open architecture, open access, open licensing diversity, choice and autonomy (CIET). This innovative platform offers a wealth of e-content and QR-coded textbooks, revolutionising how students engage with educational material. By seamlessly integrating technology into the learning process, DIKSHA aims to enhance the educational experience for students nationwide. One of DIKSHA's key strengths lies in its comprehensive support for teachers. The platform equips educators with diverse resources, empowering them to facilitate effective classroom transactions. This support is instrumental in fostering a dynamic and interactive learning environment. Through the convergence of digital resources and traditional pedagogy, DIKSHA bridges the gap between technology and education, ensuring that students and teachers are well-equipped for the demands of the contemporary educational landscape. In essence, DIKSHA emerges as a catalyst for transformative educational practices, propelling India's school education system into a future of innovation and accessibility.

- **NROER (National Repository of Open Educational Resources):**

The National Repository of Open Educational Resources (NROER) is a comprehensive digital repository that fosters education through diverse resources. This platform provides an extensive range of learning materials, encompassing audio, video, and interactive content. With a primary focus on open educational resources (OER), NROER actively encourages educators and students to utilise them. NROER is a dynamic educational content hub facilitating a collaborative and accessible learning environment. Teachers and students benefit from the resources available on the platform, which covers various subjects and learning levels. By promoting open educational resources, NROER contributes to democratising education, breaking down barriers and enhancing the quality of learning experiences. As a digital reservoir of knowledge, NROER plays a pivotal role in shaping modern educational practices and fostering a culture of sharing and accessibility.

- **Swayam Prabha:**

Swayam Prabha operates 32 Direct-to-Home (DTH) channels that broadcast educational content tailored to school and higher education levels. The primary objective of this initiative is to extend educational outreach to rural and remote areas where internet accessibility is limited. By utilising DTH technology, Swayam Prabha aims to bridge the academic gap by delivering curriculum-based materials directly to households. These 32 channels cover diverse subjects, providing a comprehensive learning experience for students in geographically isolated regions. Recognising the challenges posed by inadequate internet infrastructure in these areas, Swayam Prabha leverages satellite-based broadcasting to ensure reliable and widespread dissemination of

educational content. This innovative approach reflects a commitment to democratising education, making quality learning resources accessible to all, irrespective of their geographical constraints.

- **National Digital Library (NDL):**

The National Digital Library (NDL) is a comprehensive repository housing academic content in diverse formats, such as books, articles, and theses. Its primary aim is to provide seamless access to educational resources, promoting learning anytime, anywhere. By embracing digital technologies, the NDL transcends traditional constraints, ensuring users can effortlessly tap into a wealth of knowledge at their convenience. This dynamic platform caters to a broad spectrum of academic needs, fostering a learning environment that adapts to the evolving landscape of education. Whether accessing scholarly articles, exploring in-depth theses, or delving into the vast collection of books, the NDL empowers individuals to enhance their educational pursuits. As a centralised hub for academic materials, it aligns with the modern ethos of accessibility, enabling students, researchers, and enthusiasts to engage with valuable content and contribute to the continuous evolution of knowledge.

- **VidyaDaan:**

VidyaDaan is a collaborative platform fostering collective contributions from individuals and organisations dedicated to curating a rich repository of diverse digital educational content. This initiative is a dynamic hub, inviting active participation to build a comprehensive resource pool. VidyaDaan aims to amplify access to varied educational materials by uniting contributors' efforts and fostering a holistic learning experience. The platform thrives on the ethos of knowledge-sharing, encouraging the submission of digital content that spans a broad spectrum of subjects. From individuals passionate about sharing their expertise to organisations committed to educational outreach, VidyaDaan is a nexus for the collective pursuit of enriching educational resources. As a testament to the power of collaboration, VidyaDaan aspires to become an invaluable resource, democratising education and making quality learning materials accessible to a global audience.

- **IGNOU's eGyankosh:**

eGyankosh serves as Indira Gandhi National Open University's (IGNOU) digital repository, offering a comprehensive platform for educational resources. This repository plays a pivotal role by granting access to diverse study materials, including textbooks, question papers, and multimedia content. As a crucial component of IGNOU's academic infrastructure, eGyankosh facilitates seamless learning experiences for students enrolled in various programs. The platform enhances accessibility, enabling learners to retrieve essential resources conveniently. Whether reviewing course materials or accessing past question papers for exam preparation, eGyankosh serves as a valuable hub for IGNOU students. The repository's digital interface contributes to the university's mission of providing flexible and inclusive education, fostering a dynamic and interactive learning environment for distance education students.

- **SMART Classrooms:**

SMART Classrooms revolutionise traditional education by seamlessly integrating technology into the learning environment. These cutting-edge classrooms feature interactive whiteboards that transform conventional blackboards into dynamic, digital interfaces. Incorporating digital content amplifies educational engagement, providing students with a rich multimedia learning experience. Across diverse schools, this innovative approach aims to transcend traditional teaching methods and foster a more interactive and collaborative learning atmosphere. SMART Classrooms leverage technology to create dynamic lessons, enabling educators to customise content and adapt to students' individual learning needs. As a result, students are not merely recipients of information but active participants in the learning process. This educational evolution reflects a commitment to preparing students for the digital age, where technology proficiency is integral to success. SMART Classrooms represent a forward-thinking approach that seeks to enhance education's overall quality and effectiveness through the strategic integration of technology.

- **E-textbooks:**

The e-Pathshala app and web portal allow access to e-textbooks and audio and video content from NCERT in English, Sanskrit, Urdu, and Hindi.

- **Radio:**

Shiksha Vani is a CBSE radio show used by students in grades 12 to 9. It contains more than 430 pieces of audio content for all subjects.

These initiatives collectively advance open and digital learning in India, fostering a more inclusive and accessible education system. India's educational landscape has undergone a transformative revolution with initiatives like SWAYAM, NPTEL, ePathshala, DIKSHA, NROER, Swayam Prabha, National Digital Library, VidyaDaan, eGyankosh, and SMART Classrooms. These diverse platforms collectively commit to democratising education, leveraging digital resources, and fostering accessibility. From online courses to digital textbooks satellite broadcasting to collaborative content creation, they reflect a dynamic and inclusive approach, propelling India towards a future where technology empowers learners at every educational stage.

CHALLENGES IN OPEN AND DIGITAL LEARNING IN INDIA

Open and digital learning in India faces several challenges. Limited access to technology and the internet hampers widespread adoption. Socioeconomic disparities exacerbate the digital divide, hindering educational equality. Quality content creation and localisation pose hurdles, as does the need for digital literacy among educators and students. Infrastructure limitations in rural areas further impede seamless integration. The lack of digital infrastructure disrupts online education, which, otherwise, is a highly effective means of delivering education to the last mile. Government policies, push for digitisation of education, and better infrastructure would address these needs, making education more accessible, equitable and equal. Ample training sessions that equip

teachers at the grassroots to learn new technologies will further smoothen this transition. Additionally, there's a necessity for policy frameworks that address the unique dynamics of open and digital learning.

- **Infrastructure Disparities:** Unequal access to reliable internet connectivity and digital devices among different regions and socio-economic groups hinders the widespread adoption of digital learning.
- **Digital Literacy Gap:** Limited digital literacy skills, particularly in rural areas, challenge effective participation in online learning platforms and the utilization of digital resources.
- **Language Diversity:** India's linguistic diversity makes providing digital content in various languages challenging, limiting accessibility and understanding for a significant portion of the population.
- **Content Relevance:** Ensuring that digital learning content is culturally relevant and aligns with diverse educational backgrounds is crucial to engaging students effectively.
- **Teacher Training:** Inadequate training for educators to effectively integrate technology into teaching methods and leverage digital tools for an enhanced learning experience.
- **Affordability:** Digital devices, data plans, and other associated expenses can be a barrier for many students and families, especially in economically disadvantaged areas.
- **Assessment and Evaluation:** Developing reliable methods for fair and secure digital assessments poses challenges, including preventing plagiarism and ensuring the integrity of online examinations.
- **Government Policies:** Evolving and coherent policies are required to regulate digital learning, ensure quality standards, and address potential issues related to accessibility, inclusivity, and data privacy.
- **Social Equity:** Digital learning exacerbates existing social inequalities. Students with limited access to technology may fall behind their more privileged counterparts, widening the education gap.
- **Technological Infrastructure:** Continuous improvements in technological infrastructure are necessary to support the increasing demand for seamless, high-quality online learning experiences nationwide.
- **Language Barriers:** The availability of quality digital content in regional languages is limited, posing a challenge for students more comfortable with vernacular languages.
- **Teacher Preparedness:** Many educators may not be adequately trained to use digital tools effectively, which can impact the quality of online teaching.

OPPORTUNITIES FOR THE IMPLEMENTATION OF OPEN AND DIGITAL LEARNING IN INDIA

Digital learning has plenty of advantages for teachers, students and administrators. Teaching and learning can occur whenever and wherever it is most convenient for everyone. Education in teaching and learning process changing Digital mode. Colleges and universities change curriculum digital mode.

- **Educational Accessibility:** Open and Digital Learning can bridge gaps in access to education, reaching remote areas and underserved populations in India.
- **Skill Development:** Implementation can focus on skill-oriented courses, addressing the need for practical, job-relevant skills, thereby contributing to India's workforce development.
- **Language Diversity:** Multilingual content can cater to India's diverse linguistic landscape, making learning materials more accessible and inclusive.
- **Cost-effective Education:** Open and Digital Learning reduces the cost of traditional education, making quality education more affordable and scalable for a larger audience.
- **Customisation and Personalization:** Digital platforms enable personalised learning experiences, catering to individual learning styles and pacing, enhancing overall learning outcomes.
- **Teacher Training:** Providing digital tools and resources for teacher training can enhance the quality of education by empowering educators with modern teaching methodologies.
- **Government Initiatives:** Aligning with national education policies and initiatives, integrating Open and Digital Learning can complement and support the government's efforts to improve education infrastructure.
- **Continuous Learning:** Promoting a culture of lifelong learning, these platforms can facilitate continuous skill upgrading for professionals, contributing to a more dynamic and competitive workforce.
- **Interactive Content:** Implementing interactive and engaging content, such as virtual labs and simulations, can enhance the learning experience, particularly in science and technology.
- **Assessment and Certification:** Leveraging digital tools for assessment and certification ensures a transparent and standardised evaluation process, reinforcing the credibility of online education.

- **Global Collaboration:** Open and Digital Learning can foster collaboration with international educational institutions, promoting cross-cultural learning experiences and knowledge exchange.
- **Technological Infrastructure:** Investments in robust internet connectivity and technology infrastructure are crucial for successful implementation, ensuring widespread access and usability.
- **Monitoring and Evaluation:** Implementing effective monitoring and evaluation mechanisms can track the impact and quality of Open and Digital Learning initiatives, guiding continuous improvement.
- **Community Engagement:** Involving local communities in the design and implementation process ensures that Open and Digital Learning aligns with specific regional needs and cultural nuances.
- **Entrepreneurship and Innovation:** Emphasising entrepreneurship and innovation in education can spur creativity and problem-solving skills, aligning with India's aspirations for a knowledge-driven economy.

CONCLUSION

In conclusion, India's Open and Digital Learning Initiatives mark a transformative leap towards inclusive education. They conclude that digital learning is the most crucial aspect of education. 21st-century education is the most vital to a nation's development. However, education is essential for our economy, society, and society. 21st-century education in India has many challenges and opportunities. We want to speak about digital learning and highlight it so that the government can resolve such issues. You would like to read this text to urge thoughts about ways to overcome digital learning. 21st-century opportunities are available, but how to benefit from them and make them accessible to others may be a matter of concern. Digital classrooms, online classes, and ICT tools are developing education for better opportunities. While facing challenges such as infrastructure disparities and digital literacy gaps, the opportunities presented, including educational accessibility, skill development, and cost-effective learning, showcase the potential for a dynamic and equitable educational landscape. With strategic investments, policy support, and community involvement, India can harness the full potential of these initiatives, propelling the nation towards a knowledge-driven future.

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CHAPTER NINETEEN

CHALLENGES AND OPPORTUNITIES OF OPEN AND DIGITAL LEARNING IN THE 21ST CENTURY IN INDIA

Suman Devi

ABSTRACT

Digital learning is a powerful tool for building a knowledge-based society. This paper explains the challenges and opportunities of the digital learning effect in the 21st century in India. Digital learning is one of the most critical forms of education, and education is a nation's strength. In India, education is conducted at various stages, including primary, secondary, higher, and university levels. The Indian education system is the third-largest in the world, following the United States and China. Since independence, India, as a developing nation, has made continuous progress in education. In recent years, the Government of India has launched several initiatives as part of its vision for a digital India. These include the Digital India program, the Make in India campaign, and the Smart Cities Mission. Many Indians are well-known globally for their capabilities and skills. To develop India into a digital nation and become a prosperous partner in global development, India must strengthen higher education through research and development. This paper focuses on India's overall open and digital learning landscape. It elaborates on identifying the issues and challenges in the field of digital learning in India. Finally, the paper concludes that all stakeholders must make joint efforts to address the problems in higher education in India. Many challenges within the education system also present opportunities to improve it and create a system that offers superior education for the digital learning of the 21st century.

Keywords: Education, Digital Learning, 21st Century, Challenges, Opportunities

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INTRODUCTION

The development of technology has brought tremendous change to almost every sphere of life. Technology has also impacted the process of education. Face-to-face education has experienced a remarkable change in the last 10 years. Although face-to-face education is still considered the norm, the acceptance of online courses in management and engineering is increasing. One reason for the exponential growth of online education is that it is instant, online, anywhere accessible, self-driven, and on the go. The primary reason for the phenomenal growth in online education is MOOCs (Massive Open online courses). According to Kaplan and Haenlein (2016), MOOCs are online courses aimed at unlimited participation and offer open access through the web. MOOCs have gained a lot of popularity since their development in 2008.

Over 800 universities worldwide have launched at least one MOOC to date. According to a report by Class Central, there were 83 million students who had registered for MOOCs by December 2017. The list of top five MOOC providers by registered users includes Coursera and Future Learn. The government supports online education in India because of its potential to improve education quality and reach through the Digital India initiative. The Ministry of HRD has initiated a program named SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) designed to achieve the three fundamental objectives of Education Policy, i.e., access, equity, and quality. The main objectives of this effort are to provide quality teaching and learning resources to all, including those who cannot afford them. This program, SWAYAM, seeks to provide education to those students who have yet to be made aware of the digital revolution occurring and are still unable to join the mainstream of the knowledge economy. Nearly 2000 online courses are offered through Swayam, and approximately 150 million students across the globe are enrolled in different courses. Education is a process for all children. Therefore, the government provides education in all other ways. Learning is a lifelong process. Digital learning is a combination of content and methods. Electronic elements deliver it. Digital learning is one of the most critical forms of education. Digital learning is Bringing education into a new dimension.

Digital education is a technique or learning method involving technology and digital devices. This new and broad technical sphere will help any student attain knowledge and gain information from any corner of the country. Digital education in India is believed to be the future of education and learning. The COVID-19 pandemic has disrupted the education system in India. Since the first lockdown in March 2020, all states have responded to COVID-19 with speed and innovation. The use of digital media in education has increased.

EDUCATION IN INDIA

India's education system is the largest in the world. The school system in India has two levels – the primary school level (lower primary age 6 to 10, upper primary age 11 and 12) and the secondary school level (secondary age 13 to 15, higher secondary age 17 and 18 years). The lower primary school is divided into five “standards”, upper primary school into two, the high school into three, and the higher secondary school into two. Students have to learn a standard curriculum largely (except for regional changes in their mother tongue) until the end of high school. Some

specialisation is possible at the higher secondary level. In the Indian education system, different types of schools are maintained. Government schools, government-aided private schools, Private schools (unaided), National schools, International schools, and Home-schooling.

At the next stage, college or university level, the most essential administration at the tertiary level is the University Grants Commission, which enforces its standards, advises the government, and helps coordinate between the middle and, therefore, the state. Accreditation for higher learning is overseen by 15 autonomous institutions established by the University Grants Commission (UGC). As per the newest 2011 Census, about 8.15% (68 million) of Indians are graduates, with Union Territories of Chandigarh and Delhi topping the list with 24.65% and 22.56% of their population being graduates, respectively. At the level of Open and distance learning schools, the National Institute of Open Schooling (NIOS) provides opportunities for continuing education. Those who missed completing school education. 14 lakh students are enrolled at the secondary and higher secondary level through open and distance learning. State governments also introduced in 2012 "State Open School" to provide distance education. Indira Gandhi National Open University (IGNOU) coordinates distance learning at the higher education level. It has a cumulative enrolment of more than 15 lakhs, serviced through 53 regional centres and 1,400 study centres with 25,000 counsellors. The Distance Education Council (DEC), an authority of IGNOU, coordinates 13 State Open Universities and 119 institutions of correspondence courses in conventional universities. These open and distance educational centres mainly maintain digital learning.

DIGITAL EDUCATION

Digital education means digital learning. It is a type of learning supported by digital technology or by instructional practice that effectively uses digital technology. Digital learning occurs across all learning areas and domains, creating win-win opportunities for all. On one hand, digital education is causing schools, colleges, and institutions to experience a rapid rise in enrolment and added revenue.

On the other hand, students view this as a flexible and alternative option, allowing them to study at their convenience, at their own time, and pace (Gonda and Gupta, 2017). In recent years, the Government of India has launched several initiatives as part of its vision for a digital India. These include the Digital India program, the Make in India campaign, and the Smart Cities Mission. Digital education in India has evolved at a faster rate over the years. It helps the students to learn complex concepts and theories more easily through visual effects and graphics, 3-D models, etc. For example, drawing and explaining Electromagnetic waves on a chalkboard is difficult. Through the use of digital media, it's easy to explain things. Digital learning involves more student participation as the current generation of students is well-versed with laptops, iPads, and smartphones. We can find many government and private players in digital education, such as e-Pathshala by NCERT and DIKSHA by MHRD, as well as private educational platforms like Tata Class Edge and BYJU. The Basic Components of Digital Education Information and communication technology in education are based on specific prerequisites. Only after meeting these basic infrastructural requirements can we move towards the digitisation of education.

Digital education is primarily a result of the past few years, though it has already existed slightly earlier in various ways. It is evident, however, that modern equipment and means of transmitting information are essential for its growth. Thus, this form of education would only be feasible with the rapid development of computers and the Internet. It can be inferred that they were primarily concerned with digital education and somehow forced its advent because the proliferation of computers and broadband Internet gave a powerful impetus to use them in educational activities. Consequently, interactive classes, modern e-learning courses, educational games, electronic assessments, educational resource portals, digital school registers, and learning process management systems have entered daily existence.

DIGITAL LEARNING

Digital learning may be a combination of context and method with electronic elements. It's associated with technology. It encompasses applying a good spectrum of practices, including virtual learning. While online and e-learning are sometimes mistaken for digital learning, the two are different. Digital learning approaches include:

Adaptive learning and Blended learning

1. Classroom technologies and E-textbooks
2. Learning analytics and Learning objects
3. Mobile learning: e.g. Mobile Phones, Laptops, Computers, iPads.
4. Personalized learning
5. E-learning or online learning and Open educational resources (OERs)
6. Technology-enhanced teaching and learning

DIGITAL LEARNING PEDAGOGIES

Listed below are common pedagogies, or practices of teaching, that combine technology and learning:

A. Blended/hybrid learning

1. Online learning
2. Flipped learning

B. Differentiated learning

1. Individualized learning
2. Personalized learning
3. Understanding intentionally (UBD)
4. Universal Design for Learning (UDL)

DIGITAL LEARNING TOOLS AND RESOURCES

The internet has numerous tools and resources. These will be used to develop and improve the online learning environment. The following are tools and resources that instructors in the twenty-first century can utilise for digital learning:

1. Google class
2. Easy class
3. RSS or Social Readers
4. Google+ Communities
5. YouTube Channels - iTunes
6. Cloud-based Word Processors (i.e. Google Drive)
7. File-sharing platforms (i.e. Dropbox) - Evernote - Digital Pocket

21st CENTURY DIGITAL EDUCATION IN INDIA

Indian education has undergone significant changes recently. Previously dominated by a teacher-centred approach, it has shifted to a student-centred model. Today, education garners considerable attention from all sectors of society. As the world evolves, 21st-century education adapts to extraordinary changes that enhance students' learning experiences.

Modern Technology in the Learning Program

Technology improves community interaction, and educationists develop new methodologies and pedagogies. It makes learning natural and is the key to the future. Technology impacts interdisciplinary learning and research-based innovation. The digital classroom, online learning, ICT tools, artificial intelligence, Robotics, Virtual Reality, and so forth have revolutionised the education sector, bringing new ideas to the education system.

Development of Students' Thinking Skills

The student is the centre of education. Education that develops higher-order thinking skills is provided for students.

The Goal of Modern Education

Modern education ensures that children would be problem solvers, decision-makers, and enablers.

Skill-Based Education

Skill-based learning, which can be useful for students' future flexible learning paths, focuses on imparting life skills, student-centered learning methods, and the use of technology.

Modern Teaching Methodology

Modern teaching methodology is focused on analytical and critical thinking skills. Students who develop transferable abstract thinking skills and reflective observation skills can help them develop future careers.

THREATS AND CHALLENGES OF DIGITAL LEARNING IN INDIA

Digital learning is having a profound impact on the education sector. In India, this shift comes with its own set of challenges. While many studies indicate that digital learning positively transforms education, it is challenging. Teachers are eager to embrace digital learning and create modern classrooms, yet face several obstacles. Here are some common challenges associated with digital learning:

Technology Is Continuously Changing

Unfortunately, technology is usually changing, so you should only expect to use equivalent tools for a while. Instead, you ought to have an idea and budget for upgrading technology.

Lack of Quality Content

With the quantity of digital content, it is overwhelming to curate a set of high-quality digital learning materials independently. Instead, your school administrators and teachers should work alongside the university librarian to develop a solid collection of content.

High Costs

Technology and digital resources are expensive. Therefore, teachers and schools should be prepared to seek grants and community support for funding.

Computer Literacy

Both students and intermediaries must possess a basic level of computer literacy to work effectively in an online environment. They need to be able to use a range of search engines, for example, access the World Wide Web easily, and be familiar with newsgroups. Without these technological tools, students and faculty members cannot excel in an online program.

Teacher's Skills

Teacher skills are most important in the teaching-learning process. However, there are currently very few training programs in education. Therefore, teacher training programs are useful for developing different methods in this process.

Digital Classroom

One of the foremost challenges for digital classrooms in India is poor internet connectivity and their establishment in rural areas and a few urban areas. The majority of the population across India still has no access to the Internet; therefore, digital classroom maintenance is very problematic. An outsized population in rural areas remains illiterate, so we cannot use digital technology there.

Technological Difficulties

We prefer to take it for granted that a laptop or desktop computer of the latest model is available to everyone. However, not every student has had the same access to technology, even for a generation of digital natives. For all their online operations, many rely on their smartphone or a tablet. Some would have restricted broadband or Wi-Fi connectivity, even though all their information comes from their phone (Cunha et al., 2020),

Language and Syllabus-related Challenge

Languages and Syllabus are among the foremost barriers to the development of digital education in India. Several different languages are spoken within the various states, and it becomes difficult to quickly transfer all the digital content to these regional languages and syllabi.

Maintenance of Digital Equipment

In rural areas, maintenance of digital equipment is one of the most challenging tasks. Digital equipment maintenance was very high.

Financing

Digital education involves effectively and efficiently using the latest hardware and software technology available in the market. Implementing digital technology into education systems in India could also be challenging. It requires large amounts of funds and infrastructure. The Digital India program promises to provide funds for technology implementation.

SUGGESTIONS/ OPPORTUNITIES IN EDUCATION AND DIGITAL LEARNING

Digital learning offers numerous benefits for teachers, students, and administrators. It allows teaching and learning to occur at any time and from any location that suits everyone's needs. As the educational landscape shifts towards digital methods, colleges and universities are adapting their curricula to these new modes. Here are some suggestions for enhancing education through digital learning.

Develop High-Quality Digital Learning Programs

High-quality learning programs are beneficial to teachers, students, and administrators. The digital learning mode is helpful to all those. These programs make it easy to understand different pedagogies and methods to teachers.

Teachers Skills Development

Digital learning is helpful for teachers in developing professional skills and making content easy to understand for students.

Digital Classroom

Every college and institute maintains a digital class. Digital class managers need help to beat the overall classroom. They offer a wide range of subject knowledge.

Online Class

Very few colleges and universities are conducting online classes—there was absolutely nothing with online education before COVID-19. Planning and understanding online education is a minimum knowledge source for brand-spanking new revenues. The web class primarily focuses on academic activities.

ICT Teaching

ICT-related teaching and learning processes are very effective and straightforward. Numerous ICT tools, such as radio, TV, Computer, etc., enable access to more knowledge. We use Facebook, WhatsApp, Google Classroom, Easy class, etc. It is helpful for information and sharing communication technology.

Providing Internet Facility

There are internet facilities in rural areas. Therefore, the government is responsible for supplying good connections through online facilities. It's helpful to cover students' suitable online classes.

Financing

Digital education is effective and efficient. Therefore, the government provides funding to develop digital classrooms.

CONCLUSION

In conclusion, digital learning significantly impacts education, which is crucial for a nation's development in the 21st century. Education is critical in advancing our economy, society, and governance. In response to rapid technological advancements, many countries have adapted their school systems to enhance students' skills in data and computation. However, despite these efforts, many national curricula still need to catch up in integrating digital education. Digital classrooms, online courses, and ICT tools are evolving to offer improved educational opportunities.

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CHAPTER TWENTY

Perceptions of B.Ed. Students' Regarding Online Versus Offline Teaching and Learning

Suman Gupta

Abstract

This study explores B.Ed. Students' perceptions of online and offline teaching and learning. It examines the impact of transitioning from face-to-face to online learning during COVID-19 and then back to offline. The paper also investigates students' willingness to choose online programs and their preferences between online and offline classes. This study employs a qualitative research approach. The population consisted of 75 student-teachers enrolled in the fourth semester of a randomly selected B.Ed. College in Jammu city. Of these, 60 student-teachers were chosen as a sample. Data was collected through an open-ended questionnaire to assess their perceptions of online versus offline teaching and learning. All (100%) student teachers viewed their instructors as vital in enhancing their teaching and learning skills during online instruction. A minority (40%) of B.Ed. student teachers preferred online teaching, while a majority (70%) preferred offline teaching, and a significant portion (80%) favoured a blended learning approach. Overall, it was observed that a mixed mode of teaching and learning in B.Ed. programs combine the strengths of both online and offline methods, offering flexibility, enhanced resources, collaboration, practical experience, and the development of essential teaching skills. Furthermore, students highlighted several benefits of online instruction, such as flexibility, access to a wide range of resources, and developing digital literacy skills. In contrast, offline instruction was praised for promoting interpersonal interaction, providing immediate feedback, and fostering a sense of classroom community. Challenges associated with online learning included technical issues, isolation, self-discipline, teaching practice, and internet connectivity challenges faced by students in rural areas, while

Keywords: Student Teachers, Perceptions, Online Teaching-Learning, Offline Teaching-Learning, Mixed Mode of Teaching-Learning

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INTRODUCTION

The education system has recently witnessed a significant shift towards online teaching and learning due to the COVID-19 pandemic. This transition has profoundly impacted students and educators, particularly those pursuing their Bachelor of Education degree. The purpose of this research paper is to explore the perceptions of B.Ed. Students regarding online and offline teaching and learning. To understand these perceptions, examining the impact of the sudden transformation from face-to-face learning to online learning during the pandemic and the subsequent return to offline learning is essential. As online learning is a relatively novel teaching platform, it is crucial to investigate the opinions of B.Ed. students and understand the challenges they may have faced in adapting to this new mode of education. Several studies have been conducted on the perceptions of students and educators toward online teaching and learning during the COVID-19 pandemic. However, after COVID-19, the studies again shifted from online to offline. These studies have highlighted the perceptions of B.Ed. Students and various factors and challenges associated with online education and offline. Even though the online teaching-learning method offers convenience, a comfortable environment, and complete teacher support, students still prefer to join regular classes after the pandemic.

ONLINE EDUCATION

With the emergence of technology, the method of delivering education has forever changed. Online education has become a flexible instructional method of teaching wherein students can easily access study material in the comfort of their homes. Moreover, online education provides an excellent opportunity for students who need help enrolling in traditional classrooms and supports B.Ed. students in setting their own pace for studying. It helps inculcate the habit of self-discipline and time management within students and provides them access to unlimited educational resources. The students can easily set their own pace of learning as long as they have the right equipment and access to a proper internet connection. B.Ed. students often find themselves in a unique position regarding online teaching. It has become increasingly important recently, accelerated by the COVID-19 pandemic.

OFFLINE EDUCATION

Offline education is the traditional counterpart to online education and the original method of learning that allows students to have regular face-to-face interactions with their peers and teachers. As much as online education is predicted to be the future of learning, it cannot replace the holistic aspect of offline education. B.Ed. students often engage in offline or traditional face-to-face teaching experiences as part of their teacher training programs. This is a critical component of their education because it allows them to develop essential teaching skills, gain classroom management experience, and interact directly with students.

ONLINE EDUCATION VERSUS OFFLINE EDUCATION

Online education is not new; its importance came to light after the pandemic. Learning cannot replace the holistic aspect of offline education. Moreover, offline education also allows teachers

to monitor the responses and behaviour of their students and accordingly address them as and when required. Hence, no matter how advanced online education is, offline education will continue to play a vital role in the development of students. Aluko (2021) examined that a mixed approach to teaching and learning combines the strengths of both online and offline methods, offering a multifaceted educational experience that caters to the diverse needs of students.

SIGNIFICANCE OF THE STUDY

The study on the perceptions of B.Ed. students regarding online versus offline teaching and learning holds significant importance in the ever-evolving education landscape. In a world increasingly reliant on digital technology, understanding how future educators perceive these two modes of instruction is crucial. This research not only sheds light on the adaptability of B.Ed. students to modern pedagogical methods, but also informs the development of practical teacher training programs. It offers insights into the challenges and advantages of both online and offline learning environments, which can, in turn, influence curriculum design and instructional strategies. Additionally, this study can enhance the quality and relevance of teacher education, ultimately benefiting the education system and playing a pivotal role in shaping the future of teaching and learning.

REVIEW OF RELATED LITERATURE

Dadhich, Hiran, Rao, and Sharma (2022) explored the effect of COVID-19 on the teaching-learning perceptions of faculty and students of higher education in India. The paper employed a quantitative method to examine teachers' and students' perceptions of e-teaching and e-learning methods. This study aimed to give a holistic view of the ongoing online teaching-learning activities during the pandemic lockdown. The study also found no considerable difference in teacher/learner satisfaction during this academic disruption.

Manegre and Sabiri (2022) explained the emergence of virtual classrooms as an online language learning (OLL) instruction method. He surveyed 35 OLL teachers who teach English in virtual classrooms for their perceptions and opinions on working in this environment. The participants generally feel they know the students better in virtual classrooms than in other teaching environments. The teachers also perceive that students in virtual classrooms learn at the same rate or faster than in traditional classrooms and that not only would they like to see more subjects offered online, but they also generally believe that online learning in virtual classrooms may be an alternative learning method to replace traditional classroom learning and home-schooling in most subjects. Continued attention should be paid to the educational opportunities in virtual classrooms, not just for OLL, but for the emergence of other curricula.

Szopiński and Bachnik (2022) aimed to provide knowledge about how much a student's engagement, travel time to the business school, and nationality determine their perception of the value of business school education. They analysed what determines the evaluation of online studies, the frequency of participation in online courses, and the preferences regarding the mode of study in the future (offline vs. online). The respondents included native residents of Poland and migrants from countries of the former Soviet Union. Chi-squared, Kruskal-Wallis, and Mann-

Whitney tests were used to verify relationships between variables. After analysis, the student engagement variable determines the current evaluation of online studying, the change in frequency of participation since the introduction of online classes, and the preferred mode of study (online or offline).

Liu, Zhao and Su (2022) explored teachers' perceptions of students' online learning outcomes and how teacher competence in online teaching and resilience can predict these outcomes. The data of 159,203 participants were collected and subjected to correlation analyses and a moderated-mediation effect test. The results indicated that (1) teacher competence in online teaching was positively related to perceived online learning outcomes; (2) teacher resilience was positively related to the teachers' perceived online learning outcomes; (3) teacher resilience played a partial mediating role between teacher competence in online teaching and perceived online learning outcomes; and (4) teachers' age moderated the direct and indirect relation between teacher competence in online teaching and perceived online learning outcomes. The findings imply that teachers should strengthen their competence and resilience before online teaching.

Rastogi, Bansal, Keshan, Jindal, and Kumar (2022) examined the perceptions regarding virtual classrooms among undergraduate students of a tertiary medical college in the U.P. A pre-designed, semi-structured questionnaire was used. The study was conducted through an online survey. Data was analysed with the help of SPSS version 21. A total of 377 participants were included in the study. More than half of the participants (54.9%) preferred a mixed learning mode, including online and offline learning. Lack of interaction with teachers (66.3%) and fellow students (57.6%) and lack of quiet space at home to listen to online classes (44%) were a few of the perceived demerits of online courses. Internet speed was one of the most challenging issues faced in online learning (78.5%). Students' perception of the blended learning mode was positive. They were, however, less enthusiastic about online learning than they were about conventional classroom learning.

Riaz, Mahmood, Begum, and Ahmad (2023) examined the students' preferences and perceptions regarding offline and online learning post-COVID-19 lockdown and with the resumption of offline classes. A cross-sectional study was conducted at King Khalid University. A convenience sampling technique was utilised to collect data from female students. A total of 480 students participated in the study. The majority (77%) felt tired after starting offline classes, and 63% felt unhappy after starting offline classes again. Most students believe that, with offline classes, they struggle with time management and concentration. Most students think that online classes make them more comfortable gaining knowledge and learning, are more alert, are more satisfied, and achieve higher exam scores. This research studied the influence of fear of getting COVID-19 after the commencement of face-to-face learning amongst the students.

Mahajan, Kumar, and Agrawal (2023) analysed the effectiveness of online teaching, from student and faculty perspectives, during the COVID-19 pandemic in higher education institutions across India. Using the Student's Evaluation of Online Teaching Effectiveness (SEOTE) scale, a survey was conducted among 1042 students in different Indian universities. The scale measured student-faculty contact (SFC), cooperation among students (CAS), active learning (AL), prompt feedback

(PF), time on task (TT), high expectations (HE), and diverse talents and ways of learning (DTWL). The research instrument also included three open-ended questions. The quantitative data were analysed using descriptive statistics and the Human Development Index (HDI). The survey of 60 faculty members recorded online teaching as sustainable, backed by institute support, flexible, and creating the possibility of peer learning. The challenges were the need for more training resources, the unsuitability of course design and practical courses for online mode, and an overhaul of pedagogy. Policymakers and digital companies should include infrastructural changes and investments at the institutional and digital platform levels.

Raja and Sivakumar (2023) examined learners' perceptions regarding technology-enabled teacher education programs. It explores the experiences and viewpoints of diverse teacher education students, ranging from pre-service teachers to experienced educators pursuing advanced qualifications. The study revealed that learners perceive technology-enabled teacher education programs positively, highlighting advantages such as increased accessibility, flexibility, engagement, and personalisation. However, they also acknowledge technical issues and the digital divide challenges. These findings emphasised the importance of ongoing research and development in technology integration within teacher education to better prepare educators for the digital age classroom.

OBJECTIVES OF THE STUDY

1. To assess the perceptions of student teachers regarding online teaching-learning.
2. To assess the perceptions of student teachers regarding offline teaching-learning.
3. To assess student teachers' perceptions of online and offline teaching-learning.

RESEARCH METHODOLOGY

Method

The research paper employed a mixed-method approach, combining qualitative and survey methods to gather comprehensive data. The qualitative method involved unstructured interviews, allowing for in-depth exploration of participants' data. Surveys were used to collect detailed data by responding to questions and contributing depth to the research.

Sample

The population comprised 75 student teachers in the fourth semester of a randomly selected B.Ed. College in Jammu city. Out of the 75 student teachers, 60 were chosen as the sample.

Tools Used

1. A self-prepared Questionnaire to assess student teachers' perceptions regarding online teaching-learning versus offline teaching-learning or a Mixed mode of teaching-learning.

2. Semi-structured interviews to assess the challenges faced by student teachers during online teaching and learning.

FINDINGS OF THE STUDY

Objective 1. To assess student teachers' perceptions regarding online teaching-learning, the number and percentage of students' responses to their perceptions are given below in Table 1.

Table 1. Perceptions of Student Teachers Regarding Online Teaching-Learning.

S.No.	Statements	Response in Percentage			
		Number	Percentage of Yes	Number	Percentage of No
1	I appreciated the flexibility and autonomy offered in online learning	50	83%	10	17%
2	I prefer live synchronous classes, recorded lectures, or a combination of both	40	66%	20	34%
3	Level of interaction and engagement in online class is more than offline class.	10	17%	50	83%
4	I feel comfortable with online assessments compared to traditional in-person tests.	50	83%	10	17%
5	I often faced internet problem during my online class	30	50%	30	50%
6	I enjoyed to communicate with their teachers and peers in online classes	10	17%	50	83%
7	My fatigue level is high during regular online classes	55	92%	5	8%
8	Online teaching and learning improved my technical skills	40	66%	20	34%

Student-teachers viewed online teaching and learning as revealing a dynamic shift in educational paradigms. 83% of B.Ed. students have embraced online learning for its flexibility and accessibility, appreciating the convenience it offers in the internship program as a real opportunity to refine and improve their teaching skills in actual school settings. 66% of students viewed online

teaching and learning as improving their technical skills. However, only 17% of students enjoyed communicating with their teachers and peers in online classes, and 92% of student teachers observed that the fatigue level was high during regular online classes.

Objective 2. Table 2 gives the number and percentage of student responses regarding their perceptions of offline teaching-learning, which is used to assess the perceptions of student teachers.

Table 2. Perceptions of Student Teachers Regarding Offline Teaching-Learning.

S.No.	Statements	Response in Percentage			
		Number	Percentage of Yes	Number	Percentage of No
1	Offline learning is a more traditional and established way of acquiring knowledge	56	93%	4	7%
2	I prefer offline learning because it offers a structured and organized learning environment	56	93%	4	7%
3	I believe that offline learning helps me to develop better discipline and time management skills	40	66%	20	34%
4	I gain confidence in teaching practice during offline teaching.	58	97%	2	3%
5	Offline learning allows me to access resources like libraries and labs and printed material that are not available in online learning.	50	83%	10	17%
6	I believe that offline learning provides a better opportunity for interaction with teachers and peers	55	92%	5	8%
7	I believe that offline learning can be more expensive compared to online learning due to travel and materials	58	97%	2	7%
8	Offline learning provides more opportunities for extracurricular activities and personal development	55	92%	5	8%

Student-teachers viewed offline teaching and learning as a connection to traditional education methods with enduring value. 97% of students viewed offline learning as encouraging active participation and engagement in the classroom, and they gained confidence in teaching practice during offline teaching. 92% of B.Ed. students prefer offline learning environments, with their physical presence, face-to-face interactions, and real-time feedback, to be conducive to effective pedagogy and provide more opportunities for extracurricular activities and personal development. However, 93% of students viewed offline learning as a more traditional and established way of acquiring knowledge.

Objective 3. To assess student teachers' perceptions regarding online versus offline teaching-learning, the number and percentage of students' responses regarding their perceptions of offline teaching-learning are given below in Table 3.

Table 3. Perceptions of Student Teachers Regarding Online Versus Offline Teaching-Learning.

S. No.	Statements	Response in Percentage			
		Number	Percentage of Yes	Number	Percentage of No
1	Online teaching offers flexibility which is not possible in offline teaching	58	97%	2	3%
2	Online education is ideal for those with special needs or physical disabilities, as it provides more accessible learning options	55	92%	5	8%
3	Offline teaching allows for hands-on experiences during teaching practice which are challenging to replicate online	60	100%	0	0%
4	Offline teaching allows for more face-to-face interaction with teachers and peers which is not possible in online	60	100%	0	0%
5	Offline teaching provides a structured environment, making it easier to stay focused and committed to the coursework	58	97%	2	3%

6	Blended learning caters to different levels of technological proficiency; it allows students to gradually adapt to online tools and resources	55	92%	5	8%
7	Blended approach can address the limitations of both purely online and offline education, such as geographical constraints and the need for digital literacy	60	100%	0	0%
8	Blended learning promotes self-discipline and time management, essential skills for both online and offline components.	50	83%	10	17%

Some student-teachers believe online learning offers convenience, flexibility, and various digital resources. Still, it can also present challenges related to screen fatigue, reduced social interaction, and the need for self-discipline. On the other hand, offline learning, characterised by in-person interactions and a structured environment, provides a sense of community but may lack the adaptability and accessibility of online platforms. Overall, it was viewed that 40% of B.Ed. student teachers preferred online teaching, 70% preferred offline teaching, and 80% preferred a mixed mode of teaching and learning, i.e. blended learning. According to them, a blended approach can address the limitations of both purely online and offline education, such as geographical constraints and the need for digital literacy.

EDUCATIONAL IMPLICATIONS

The research paper on the "Perceptions of B.Ed. Students regarding Online versus Offline Teaching and Learning" has several significant educational implications:

- 1. Curriculum Design:** The findings can inform the design of teacher education programs. It can help curriculum developers incorporate the most effective elements of online and offline teaching methods, ensuring that B.Ed. students are prepared to excel in diverse educational settings.
- 2. Pedagogical Strategies:** The research can help educators refine their pedagogical strategies. Understanding how students perceive the advantages and challenges of both online and offline learning can guide instructors in creating more engaging and effective learning experiences.

3. **Equity in Education:** The research can highlight disparities in access to online education and inform efforts to bridge the digital divide, ensuring that all B.Ed. students have equal opportunities for quality learning experiences.

4. **Quality Assurance:** The research can contribute to developing quality assurance measures for online and offline education. It can guide the establishment of benchmarks and standards for teacher education programs to maintain high-quality teaching and learning experiences.

5. **Policy Development:** Policymakers can use this research to develop policies that support and regulate the integration of online and offline teaching methods, ensuring that they align with the education sector's evolving needs.

6. **Continuous Assessment:** The study's insights can promote continuous assessment and improvement of teacher education programs. Institutions can regularly review and adapt their methods to address students' changing perceptions and needs.

7. **Research Continuation:** This research can serve as a foundation for further studies in teacher education and inform ongoing research efforts to understand the dynamics of online and offline teaching and learning, contributing to the growth of knowledge in the field.

SOME MEASURES SUGGESTED BY STUDENT-TEACHERS

Student-teachers in B.Ed. programs often have valuable insights into improving the mixed approach to teaching and learning. To enhance the effectiveness of this method, they have provided the following suggestions.

1. Clear Communication

Teachers should ensure that instructions, schedules, and expectations for both online and offline components are clearly communicated to student-teachers. This helps reduce confusion and improve engagement.

2. Active Online Engagement

They should encourage student-teachers to actively participate in online discussions, forums, and collaborative activities. Online engagement is crucial for learning in a mixed approach.

3. Timely Feedback

Instructors should provide prompt and constructive feedback on assignments and online interactions, allowing student-teachers to learn and grow from their experiences.

4. Interactive Workshops

To prepare student-teachers for virtual instruction, they should conduct interactive workshops or webinars on effective online teaching methods, technology use, and online classroom management.

5. Peer Learning

Promote peer learning by encouraging student-teachers to collaborate on online projects, share teaching resources, and learn from each other's experiences.

6. Inclusivity

The teachers should ensure that the mixed approach is inclusive and addresses the needs of all student-teachers, including those who may face technology or accessibility challenges.

7. Reflection and Evaluation

They should encourage student-teachers to reflect on their experiences and evaluate the effectiveness of the mixed approach in terms of their learning and preparedness for teaching.

CONCLUSION

In conclusion, research on the perceptions of B.Ed. students regarding online versus offline teaching and learning have shed light on a complex and evolving educational landscape. This study's findings have provided valuable insights into the experiences, preferences, and challenges faced by B.Ed. students when engaging in both online and offline modes of education. Offline teaching plays a central role in the education and training of B.Ed. students. It offers unique benefits regarding hands-on experience, mentorship, immediate feedback, and the development of essential teaching skills. However, it also comes with its own challenges, including limited flexibility, resource constraints, and in-person classroom dynamics. B.Ed. programmes typically aim to balance theory and practice to prepare future educators effectively.

Online teaching can be a valuable tool for B.Ed. students, offering flexibility, diverse learning resources, and collaboration opportunities. However, it also presents challenges related to limited face-to-face interaction, self-discipline, technology access, assessment, and curriculum adaptation. The key is for educational institutions to design online programs that effectively balance these factors to prepare future educators for success in diverse teaching environments. Overall, B.Ed. students prefer mixed approaches to teaching and learning. A mixed approach combines the strengths of online and offline methods, offering flexibility, enhanced resources, collaboration, practical experience, and the development of essential teaching skills. This approach prepares future educators to excel in diverse teaching environments and helps them adapt to evolving educational trends.

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CHAPTER TWENTY ONE

STUDENTS' PERCEPTIONS REGARDING FLIPPED LEARNING AT THE HIGHER EDUCATION LEVEL

Uzma Pervaiz and Nishta Rana

ABSTRACT

Flipped learning is emerging as a significant pedagogical approach in higher education, transforming traditional teaching methods for the digital era. This study investigated students' perceptions of flipped learning and its impact on their higher education experience. Data were collected from 200 college students through random sampling using a self-prepared assessment tool that measured perception across five dimensions: Motivation, Autonomous Learning, Critical Thinking, Attention Capacity and Self-Assessment. Statistical analyses were conducted using SPSS, employing t-tests to evaluate perception differences based on gender and institution type. The findings revealed that most students demonstrated moderate to strongly positive perceptions of flipped learning, although a small fraction expressed opposing views. Whilst no significant gender-based differences were observed in dimensions such as Autonomous Learning, Attention Capacity, Critical Thinking, and Self-Assessment, male students exhibited significantly higher motivation levels. Additionally, institution type emerged as a significant factor, with government college students scoring higher across all dimensions, including overall scores, than their private college counterparts. These findings offer valuable insights for implementing flipped learning in higher education settings.

Keywords: Flipped learning, higher education, student perceptions

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INTRODUCTION

Due to the emergence of educational technologies, pupil-centred instruction has become more suitable over the decade. Studies have indicated that pupil-centered instruction can lead to advanced situations of learner autonomy, performance, and provocation (Smit, Brabander, & Martens, 2014). One of the most effective pupil-centred educational models, the flipped classroom approach, reverses the instruction process from the traditional classroom by having scholars review literacy accoutrements before coming to class. Later, during a class session, preceptors will guide pupils through school work assignments, problem-working exercises, and peer commerce sessions to promote discerned instruction, substantiated instruction, and high-order literacy (Yarbro, Arfstrom, McKnight, & McKnight, 2014). Similarly, while pupils have to take control of their education, they can acquire substantiated backing. Throughout the process, the rearmost educational technologies, especially video recording technologies, are integrated with ways that grease and nurture literacy and tutoring for scholars and preceptors (Bergmann & Sams, 2012).

We are all going through a period of globalisation in which technology has become a thick part of every aspect of our lives. With the rapid appearance of modernisation, technology has taken a coming step, allowing knowledge to come electronically (Kar et al. 2014). Flipped Classroom is a relatively new term in the educational field (Berrett, 2012). The pivotal thing in flipping a classroom is to ensure scholars have more profound knowledge and experience. It's an active knowledge strategy that combines pupil exertion, blends various knowledge styles, and disseminates knowledge resources in a podcast. The flipped approach allows scholars to electronically partake their questions with the teacher at home and receive immediate feedback from the instructors (Bergmann and Sams, 2012). It promotes the active participation of scholars to make training-learning easier and more accessible for the learners. Instructors enhance scholars' capability for independent problem-solving by applying this strategy, where they can give individual backing to the scholars. The flipped learning approach enables scholars to study through interactive technologies analogous to watching videos at home online and preparing themselves to apply active knowledge strategies in classroom training- knowledge (Roach, 2014). It ultimately adopts a learner-centric approach, which increases the position of education both qualitatively and quantitatively.

Flipped learning

Flipped learning is an active, pupil-centred approach that's designed to increase the quality of the period within the class (Aşıksoy & Ozdamli, 2016; Nolan et al., 2021), provides openings for structured, active literacy (Strelan et al., 2020), and encourages scholars to interrogate and to interact with preceptors, peers, and employers. It has implicitly enabled preceptors to cultivate critical and independent studies in their scholars, erecting their capacity for lifelong literacy and preparing unborn graduates for their plant surroundings (O'Flaherty et al., 2015). As a pedagogical model, the FC requires a commitment and active participation of scholars in learning conditioning both before and in the classroom, all with the donation of IT (Aprianto et al., Aprianto, Ritonga, et al., 2020; Aprianto, Purwati, et al., 2020; He et al., 2016). The FC is scalable

and can be acclimated to meet scholars' learning requirements. It can include flipping just a particular literacy unit, only a part, or the whole course.

The flipped classroom model differs from the traditional model in which first exposure occurs through lectures in class, with scholars assimilating knowledge through schoolwork. A flipped classroom entails a change for preceptors, with much further education-pupil commerce. The educator acts as a facilitator and companion, giving particular feedback to individual scholars and making a more cooperative and collaborative donation to the tutoring process. Bergmann and Sams (2012) editorialised that the system is believed to eventually encourage pupil literacy because scholars are diligently engaged in the literacy process, and the educator has further time to interact with scholars collectively or in small groups.

REVIEW OF RELATED LITERATURE

Shih and Tsai (2017) studied students' perceptions of a flipped-classroom approach to facilitating online project-based learning in marketing research courses. Data was collected from 67 students of Kaohsiung City, Taiwan. Mixed methods research was employed with questionnaires, semi-structured interviews, online learning notes, and online discussions. Results demonstrated that FC-OPBL significantly enhanced students' learning effectiveness, motivation, and interest. The combined strategy improved comprehension of marketing research concepts and spurred higher engagement levels and proactive learning behaviours.

Moreover, it encouraged diverse development, catering to varied learning styles while fostering teamwork through collaborative online projects. The study's findings provided valuable insights into students' perceptions, subsequently offering suggestions for refining flipped classroom methodologies in diverse educational contexts. Ultimately, the findings underscored the positive impact of FC-OPBL on learning outcomes and student engagement while illuminating pathways for further instructional enhancements and research in flipped classroom practices.

Aljaraideh (2019) examined students' perceptions of flipped classrooms while studying in private universities in Jordan. Data was collected from 495 students of all private universities in the Northern province of Jordan. The analytical descriptive approach was employed in this study. Data was analysed using a t-test and one-way ANOVA. The study revealed a strong positive reception of the flipped classroom model among students, who highly agreed with its efficacy in enhancing learning. Male students exhibited better perceptions of the flipped classroom than their female counterparts. However, no significant differences emerged concerning students' perceptions based on study year or university type.

Musdi et al. (2019) studied students' perceptions of flipped classroom learning. Data was collected from X-grade students in West Sumatra, Indonesia, through semi-structured interviews and questionnaires. The data was analysed using a qualitative method. The study's findings showed that students are interested in this approach. This is because they can learn the material whenever and wherever they want.

Onojah et al. (2019) studied undergraduate students' perception of using flipped classrooms for learning in South-West Nigeria. Data was collected from 1800 undergraduate students of south-west Nigeria. A cross-sectional survey was adopted in this study. The study's findings reveal that students from federal institutions find flipped learning more useful than students from private institutions. When comparing gender differences in perception, results indicated no significant disparity between male and female students in their perceived usefulness or ease of use of flipped classroom learning. Both genders similarly viewed flipped classrooms as beneficial and user-friendly for educational purposes. These findings suggest a shared positive perception of flipped classrooms among undergraduate students, irrespective of gender, emphasising their perceived utility and ease of use in the learning process.

Colomo-Magaña et al. (2020) conducted a study on university students' perception of the usefulness of the flipped classroom methodology. Data was collected from 123 students from the Faculty of Educational Sciences of the University of Málaga (Spain). Data were analysed by using the non-parametric Mann–Whitney U test. The study's results show that most students emphasise the method's positive impact. The result found no significant differences in perceptions between males and females across various aspects of the flipped classroom. While minor variations were observed in one item, females showed slightly higher regard for the method's ability to promote autonomous learning; the overall agreement remained consistent across both genders.

Kazu and Kurtoglu (2020) researched flipped classrooms based on students' perceptions. Data for the study was collected from 745 students from five different secondary schools in Elazig. The survey method was adopted for this descriptive study. Data were analysed using SPSS Program Version 22.0. The result regarding gender differences revealed statistical variations favouring females in self-directed learning, doing previews, and motivation for learning, while males exhibited higher scores in technology self-efficacy. The study's findings also revealed that flipped classroom readiness has a positive impact. Students who have a computer and those who perceive themselves as competent at using technological devices have more favourable opinions of the flipped classroom.

Halili et al. (2021) studied student perceptions towards using the mobile flipped classroom approach—International Journal of Web-Based Learning and Teaching Technologies (IJWLTT). Data was collected from 40 undergraduate students in Malaysia. The collected data was analysed using descriptive analysis (percentage, means and standard deviations). The study found that students were highly intrinsically and extrinsically motivated when using mobile flipped learning (MFL) in language classes. They felt more engaged, produced better quality work, and had an improved understanding of the subject matter compared to traditional methods. Additionally, students reported increased engagement and active participation in class activities with MFL. These findings echoed previous research showing the positive impact of mobile learning on student motivation, learning outcomes, and engagement.

Maidin and Shukor (2021) investigate students' perceptions of using flipped classroom approaches in their Communicative English classroom. The participants of this study were 106 students at Taiping Community College. This study employed a quantitative research design via

survey. Results of the study revealed that most students had positive perceptions towards using flipped classrooms, were highly motivated to learn, and had positive attitudes towards implementing the flipped classroom approach.

Aziz (2022) conducted a study on Bangladeshi students' perceptions of flipped classrooms: A case study. The study was conducted on 314 students of different ages, at various educational levels, and in other places in Bangladesh. It is quantitative research based on a survey method using a questionnaire as a tool. The result of the study revealed that during crises like COVID-19, 60.5% of students supported the flipped classroom approach, while 22.6% showed average agreement and 14.6% disagreed due to facing problems. However, in everyday situations, students strongly preferred traditional physical classes. While 83.1% had suitable devices for online learning, connectivity issues were significant, with 16% facing no problems, 32.7% facing substantial issues, and 51.3% experiencing moderate challenges. This highlights the importance of reliable internet access for successfully implementing flipped classrooms.

Pablo-Lerchundi et al. (2023) examined factors influencing students' perceptions of flipped learning in a teacher training program. The study involved 338 future secondary education teachers. Results indicated a positive view of flipped learning, emphasising active engagement, interactions, and personalised learning. Assessment activities were valued, although a slightly higher time commitment was noted. Younger students expressed more positive views towards flipped learning compared to older students. Notably, the study found no significant differences based on gender; men and women held similar opinions and attitudes toward the flipped classroom model.

NEED AND SIGNIFICANCE OF THE STUDY

The study on students' perceptions regarding flipped learning as a pedagogical intervention at the higher education level is critical because it can provide valuable insights into the effectiveness of this approach in enhancing students' learning outcomes, motivation, and engagement. The study can also reveal the potential of flipped learning in promoting autonomous learning and Motivation and developing students' critical thinking. Shih and Tsai (2017), Aljaraideh (2019), Musdi et al. (2019), Onojah et al. (2019), Colomo-Magaña et al. (2020), Kazu & Kurtoglu (2020), Halili et al. (2021), Maidin and Shukor (2021) and Aziz (2022) underscore the widespread positive impact of flipped classrooms on students' learning across various countries and disciplines. They consistently highlight enhanced learning effectiveness, motivation, interest, and student engagement. The flipped classroom approach fosters autonomy, encourages active participation, and allows flexible learning schedules, significantly contributing to students' positive perceptions and experiences.

Additionally, it promotes a secure learning environment and readiness among students while showcasing the potential for broader adoption and recommendation of this approach within educational settings. While existing studies have delved into the effectiveness of flipped learning, there remains a gap in understanding how students in higher education perceive this pedagogical approach. This research aims to bridge this gap by investigating students' perceptions, shedding

light on their motivation scale, autonomous learning, attention capacity, critical thinking, and self-assessment in flipped learning. The research outcomes will provide actionable insights for stakeholders, including teacher educators, teachers, administrators, policymakers, parents, practitioners, and field workers. Understanding students' perceptions of flipped learning will guide these stakeholders in creating supportive and effective educational environments.

OBJECTIVES OF THE STUDY

- To examine students' overall perception of flipped learning in higher education across five dimensions (*Motivation Scale, Autonomous Learning, Attention Capacity, Critical Thinking, and Self-Assessment*) on the *Flipped Learning Perception Scale*.
- The purpose of this study is to examine the differences in students' perceptions of flipped learning across five dimensions on the flipped learning perception scale in relation to the type of institution (Government/Private).
- To study the difference in the students' perception of flipped learning across five dimensions on the flipped learning perception scale in relation to their gender.

HYPOTHESES

- There is no significant difference in students' perception of flipped learning across five dimensions on the flipped learning perception scale in relation to the type of Institution (Government/Private).
- There is no significant difference in students' perception of flipped learning across five dimensions on the flipped learning perception scale in relation to their gender.

METHOD

In the present study, a descriptive method of research has been employed.

POPULATION OF THE STUDY

The population of the present study consisted of 193624 students enrolled in government and private colleges of Jammu & Kashmir. (AISHE Report 2020-21)

SAMPLE OF THE STUDY

The present study employed a random sampling technique to gather data from only 200 students of the Jammu division. Only those participants who had been taught by their teachers at least once through flipped learning were selected.

TOOL EMPLOYED AND ITS DESCRIPTION

For the present, the investigator has examined students' perceptions of flipped learning through a self-developed tool: the *Flipped Learning Scale*. This scale consists of 30 items divided into five dimensions: *Motivation Scale, Autonomous Learning, Attention Capacity, Critical Thinking, and*

Self-Assessment. Every item is rated on a five-point scale: Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree. The tool's Split-Half Reliability is 0.809.

RESULTS

The resulting data were analysed using the statistical technique of a *t*-test. After scoring, the data were analysed using SPSS.

RESEARCH OBJECTIVE 1

To examine students' overall perception of flipped learning in higher education across five dimensions on the flipped learning perception scale.

To accomplish objective no. 1, the number and percentage of students having Strongly Positive, Positive, Moderate, Negative, or strongly negative levels of perception on different dimensions of the *Flipped Learning Perception Scale*, namely the Motivation Scale, Autonomous Learning scale, Attention Capacity scale, Critical Thinking scale, and Self-Assessment of the *Flipped Learning Scale*, have been computed, as shown in Table 1.

Table 1
Student Perception Levels of Flipped Learning: Z-score Ranges, Frequencies, and Percentages.

S.No.	Range of z-scores	Level of Perception	Frequency (N) of Students	Percentage of Students
2	+1.26 and above	Strongly Positive	11	5.5%
3	+0.51 to +1.25	Positive	51	25.5%
4	-0.50 to +0.50	Moderate	87	43.5%
5	-0.51 to -1.25	Negative	28	14%
6	-1.26 and below	Strongly Negative	23	11.5%
Total			200	100%

Table 1 shows that 11 students (5.5%) demonstrated a strongly positive perception, 51 students (25.5%), and the largest segment, constituting 87 students (43.5%), fell within the moderate perception category. 28 students (14%) and 23 students (11.5%) exhibited negative and strongly negative perceptions, respectively.

RESEARCH OBJECTIVE 2

To study the difference in the students' perception of flipped learning across five dimensions on the flipped learning perception scale in relation to the type of institution (Government/Private).

To study the difference in students' perceptions of flipped learning across five dimensions on the flipped learning perception scale in relation to the type of Institution (Government/Private), the values of Mean, Standard Deviation (SD), Standard Error of Mean, *df*, and *t* were computed for data collected through the *Flipped Learning Perception Scale*, as shown in Table 2.

Table 2

Values of Mean, Standard Deviation, and Difference In Flipped Learning Perception of College Students In Relation To Their Type Of Institution.

Dimensions	Type of Institution	N	M	SD	SE _M	df	<i>t</i>	Level of Sig.
Motivation Scale	Government	128	17.50	2.30	0.20	198	3.04	0.01
	Private	72	16.43	2.54	0.30			
Autonomous learning	Government	128	15.98	2.90	0.26	198	3.41	0.01
	Private	72	14.62	2.27	0.27			
Attention capacity	Government	128	16.62	3.51	0.31	198	3.70	0.01
	Private	72	14.83	2.83	0.33			
Critical Thinking	Government	128	17.23	3.12	0.27	198	3.04	0.01
	Private	72	15.90	2.68	0.31			
Self-Assessment	Government	128	16.31	3.34	0.29	198	4.20	0.01
	Private	72	14.25	3.32	0.39			
Total	Government	128	83.62	11.26	0.99	198	4.70	0.01
	Private	72	76.04	10.48	1.23			

Table 2 presents statistical values related to the students' perception of flipped learning in relation to the type of Institution (Government/Private). The *t*-values (3.04, 3.41, 3.70, 3.04, 4.20, 4.70) for the Motivation Scale, Autonomous Learning, Attention Capacity, Critical Thinking, and Self-

Assessment of *Flipped Learning Scale* in relation to the type of Institution have shown a significant difference concerning their type of Institution. It is evident from the mean values that students in government institutions tend to hold more positive perceptions of flipped learning than their counterparts in private institutions.

Hence, Hypothesis No. 1, stating that there is no significant difference in students' perception of flipped learning across five dimensions on the flipped learning perception scale in relation to the type of institution, has been rejected.

RESEARCH OBJECTIVE 3

To study the difference in the students' perception of flipped learning across five dimensions on the flipped learning perception scale in relation to their gender.

To study the difference in the students' perception of flipped learning across five dimensions on the flipped learning perception scale in relation to their gender, the values of Mean, Standard Deviation (SD), Standard Error of Mean, *df*, and *t* were computed for data collected through the *Flipped Learning Perception Scale*, as shown in Table 3.

Table 3

Data for Difference in Flipped Learning Perception of College Students in relation to their Gender.

Dimensions	Gender	N	M	SD	SE _M	df	<i>t</i>	Level of Sig
Motivation Scale	Male	68	17.73	2.65	0.32	198	2.62	0.01
	Female	132	16.80	2.27	0.20			
Autonomous learning	Female	132	15.50	2.71	0.23	198	0.07	NS
	Male	68	16.38	3.70	0.45			
Attention capacity	Male	68	16.94	2.96	0.35	198	1.21	NS
	Female	132	16.66	3.07	0.27			
Critical Thinking	Female	132	15.36	3.20	0.28	198	0.62	NS
	Male	68	82.51	12.84	1.55			
Self-Assessment	Male	68	17.73	2.65	0.32	198	1.22	NS
	Female	132	16.79	2.27	0.20			
Total	Female	132	15.50	2.71	0.23	198	1.41	NS
	Male	68	16.38	3.71	0.45			

Table 3 presents statistical values related to the student's perception of flipped learning in relation to their gender. The *t*-values (2.62, 0.07, 1.21, 0.62, 1.22, 1.41) for Autonomous Learning, Attention Capacity, Critical Thinking, and Self-Assessment of *Flipped Learning Scale* in relation to the type of gender have shown no significant difference concerning their gender. However, the *t*-values (2.62) for the dimensions of the Motivation Scale have shown a significant difference for

gender. From the mean values, it is clear that male students exhibit significantly higher motivation levels than their female counterparts.

Hence, Hypothesis No. 2, stating no significant difference in students' perception of flipped learning across five dimensions on the flipped learning perception scale in relation to their gender, has not been rejected for the dimensions of namely Autonomous Learning, Attention Capacity, Critical Thinking, and Self-Assessment. However, it is dismissed for the Motivation Scale, which shows a significant difference in this dimension based on gender differences.

CONCLUSIONS

The significant findings of the present study are reported in this section.

Students' perceptions of flipped learning varied across dimensions, most falling into the moderate perception category (43.5%). The analysis revealed 5.5% strongly positive, 25.5% positive, 43.5% mild, 14% negative, and 11.5% strongly negative perceptions.

The students in government institutions held more positive perceptions towards flipped learning than students in private institutions. Students studying in government institutions expressed heightened motivation towards engaging with pre-recorded instructional material, attributing it to increased curiosity and interest. They firmly believed that flipped learning stimulated their independent thinking and problem-solving abilities, empowering them to establish and accomplish academic goals. Furthermore, they highlighted how flipped learning facilitated independent thinking and honed their problem-solving skills. They felt empowered to set and achieve their goals through this approach. Additionally, they perceived flipped learning as a catalyst for personalised learning, enabling them to concentrate on areas requiring more attention. This personalised focus allowed them to assess their learning at their preferred pace while aiding in identifying gaps in their knowledge and understanding.

While no significant gender differences were observed in most dimensions, male students perceived flipped learning as more motivating than their female counterparts.

DISCUSSION

The current study highlights a variation in students' perceptions of flipped learning across different dimensions. Most students fell into the moderate perception category (43.5%), indicating a nuanced reception of this learning approach. This finding aligns with Colomo-Magaña et al. (2020) and Kazu and Kurtoglu (2020), showcasing a diverse spectrum of opinions among students regarding the flipped classroom model. However, it differs from Musdi et al. (2019) and Aljaraidh (2019), where most participants exhibited strong positive perceptions toward flipped learning. One significant contrast emerged in the current study between government and private institutions students. Government institution students showed more positive perceptions of flipped learning than private institutions. This aligns partially with Onojah et al. (2019), where federal institution students favoured flipped learning more than private institution students. However, it contradicts Aziz (2022), where the preference for flipped

classrooms during crises was irrespective of institution type. The current study indicated no significant gender differences in most dimensions of flipped learning perceptions. This resonates with findings from Aljaraideh (2019), Onojah et al. (2019), and Pablo-Lerchundi et al. (2023), where gender did not significantly influence perceptions toward flipped classrooms. However, the observation that male students perceived flipped learning as more motivating than their female counterparts contrasts with the general trend observed in the previous studies. The current study's findings reflect a mixed perception of flipped learning among students, aligning with some earlier studies while deviating from specific aspects such as the impact of institution type on perceptions and the observed gender differences in motivation levels. Understanding these nuanced variations is crucial for refining the implementation of flipped classroom methodologies across diverse educational contexts.

EDUCATIONAL IMPLICATIONS

The significant difference in students' perceptions between government and private institutions suggests that educators and administrators should consider the institutional context when implementing flipped learning. Strategies and support systems may need to be tailored to address students' specific needs and preferences in different types of institutions.

The observed gender-based difference in motivation levels indicates the importance of considering gender-specific factors in designing and implementing flipped learning. Educators should explore ways to enhance motivation, particularly among female students, to ensure an inclusive and equitable learning environment.

Recognising variations in students' perceptions across disciplines underscores the need for discipline-specific approaches to flipped learning. Educators can use these insights to customise instructional strategies and resources, considering the unique characteristics and requirements of different academic disciplines.

The study highlights flipped learning's potential to promote autonomous learning and critical thinking. Educators and curriculum designers should capitalize on this potential by incorporating activities and assessments that foster independent thinking, problem-solving skills, and self-directed learning.

SUGGESTIONS FOR FURTHER STUDIES

A study can be conducted to Investigate the relationship between students' perceptions of flipped learning and their academic performance. This can help determine the effectiveness of flipped learning in enhancing students' learning outcomes.

A study can be conducted to investigate the perspectives of teachers and instructors regarding their experiences with flipped learning.

A comparative study between flipped learning and traditional teaching methods can be conducted to assess differences in student perceptions, engagement, and academic performance.

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CHAPTER TWENTY TWO

EFFECTIVENESS OF AUGMENTING PRIMARY LEVEL ENGLISH GRAMMAR LESSONS WITH OER - A CASE STUDY

Vemparala V S S Nagalakshmi

ABSTRACT

This paper presents practical classroom experiments to enhance the primary level's English language teaching-learning experience, wherein curricular teaching material, especially practice exercises, was augmented with the material drawn from OER, which offers valuable and effective resources for teaching English. In this process, the paper presents and discusses three case studies that were experimented with primary-level students at a government school in Andhra Pradesh. The study teaches three selected grammar elements to two groups of students of the same class in two ways, one in the OER augmented model and the other without OER augmentation (control method), i.e., relying only on the textbook material. The student's performance in both methods, which were assessed qualitatively and quantitatively, indicates that the proposed method brought about a 30-35% improvement in the learners over the control method.

Keywords: OER, Grammar Teaching, Classroom Experiment

INTRODUCTION

English language teaching aims to impart Listening, Speaking, Reading, and Writing (LSRW) skills to the students. The curriculum and textbooks are designed with this aim and purpose. Hence, naturally, the teaching-learning process revolves around the textbook. However, the students' heterogeneity and the learners' ever-evolving needs make the teachers look beyond the textbooks. In the present age of technology, OER, due to its versatility and adaptability, provides an excellent opportunity to augment the textbook and make the teaching-learning process more engaging, learner-friendly and practical, thereby facilitating the teaching-learning of the LSRW

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OER covers a wide range of materials, and several definitions of OER can be found in the literature. UNESCO defines OER as follows: “Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under the copyright that has been released under an open license, that permits no-cost access, re-use, re-purpose, adaptation and redistribution by others.” Open license refers to a license that respects the intellectual property rights of the copyright owner and provides permissions granting the public the right to access, re-use, re-purpose, adapt and redistribute educational materials. Another helpful description was given by Atkins et al. (2007) in the report to the William and Flora Hewlett Foundation: “OER are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and other tools, materials, or techniques used to support access to knowledge.”

Accordingly, text and multimedia material such as videos, presentations, and interactive material can be classified as OER, which can be used and reused with or without modification and improvement. They are suitable for customisation and adaptation with a high degree of ease of access. They have become a part of the educational system across the disciplines for more than two decades (Pulker & Calvi 2013). Thus, the flexibility and multifaceted advantages augur well for their English Language Teaching (ELT) applications. Therefore, OER can be used for a variety of purposes in ELT, as reported in the literature (Altunay, 2013) & (Weller, 2015), such as supplementing regular material, augmenting regular course material, for listening and reading activities, engaging and motivating students, depending on the learners' requirements, context, etc.

BACKGROUND

Notwithstanding the reasons, inadequate English language skills at the primary level are always a matter of concern, and they will likely have far-reaching effects on students' academics. Based on classroom observations, performing classroom experiments to improve teaching and learning experiences is quite a common phenomenon in education, especially considering that teachers have to deal with students of different psychological, emotional, and knowledge levels. Handling and teaching multi-grade children is challenging for teachers, demanding innovation and creativity in ELT classes to retain student interest and attention in the classroom.

Given this background, the author attempted to use OER in English language teaching to address the specific needs of primary-level students, a relatively underexplored area.

OBJECTIVES

To study the impact of augmenting the curricular teaching material with the material drawn from OER in teaching the selected grammar lessons to primary-level students.

METHODOLOGY

The target students were divided into two groups: the control group and the experimental group. The control group was taught three selected grammar elements using only the prescribed textbook material. The experimental group was taught the same three grammar topics using textbook material augmented with material drawn from OER. The students' performance was assessed using qualitative and quantitative methods, followed by a comparison of the results.

EXPERIMENTAL SET-UP

The work presented in this paper is a classroom experimental research study. The work was done in a government primary school in West Godavari District, Andhra Pradesh, India. The target students are from class V, aged 9-11 years. Forty-one students were involved in the study, 20 in the control and 21 in the experimental group. The study period was about 21 days. The following grammar elements were chosen for the study:

1. Order of adjectives
2. Difference in the usage of 'is' and 'has'.
3. Articles

Classroom Transaction (experimental work)

The material about the above three grammar topics given in the Andhra Pradesh State SCERT/NCERT textbooks was taken as prescribed textbook material to teach the control group. For the control group, the selected topics were transacted following the methods/instructions given in the textbook. The topic was explained using the bilingual method. The children were made to review the explanation and discuss it in groups. The examples were described, and the students were asked to do the exercises. Occasionally, a blackboard was used.

The experimental group was taught using material drawn from a wide range of OERs and textbooks. For instance, the following explanation, which supplements the regular material, was given while explaining the order of adjectives: The number comes first, feelings or opinions come next, and factual information comes next. An example is discussed below.

(1) ***One rose.***

“One” tells the number of roses.

(2) ***One beautiful rose.***

“One” tells the number of roses and “*beautiful*” tells the feeling. So as per the rule, the number “*one*” comes before the feeling /opinion, “*beautiful*”.

One / beautiful / rose. Number feeling
(3) One beautiful white rose. “One” tells the number of roses, “beautiful” tells the feeling and the “white” colour is factual. So as per the rule, the number “one” comes first, the feeling “beautiful” comes next and the fact “white” comes in the last. One / beautiful / white / rose. Number feeling fact

An example of the practice exercise:

There are five boxes. They are heavy. They are brown.

Describe the boxes in one sentence.

As in the case of the control group, the children were also made to go through the explanation and discuss it in groups. The purpose of this step is to encourage peer learning and support one another. During this process, the students were supported by the teacher wherever it was necessary. In both methods, the mistakes made by the students were discussed after the examination. The bilingual mode was used in both groups.

Assessment of Students’ Performance

After completing each grammar topic for each group, the students' performance was assessed quantitatively and qualitatively. For quantitative assessment, the students were given a set of exercises on the grammar topics. Also, the students were tested for their understanding of the topic and if they could explain what they understood. End of the lesson exercises and generally framed questions were used for this purpose. The following are given as examples used for assessment:

- i. The students were asked to read a sentence from the lesson or a passage and explain the order of the adjectives according to the reference rules.
- ii. The students were asked to read a sentence from the lesson using a given article or adjective.
- iii. Raman saw _____ red shirt in the shop. He asked his mother for _____ red shirt he had seen in the shop.
- iv. He _____ a toy car. It _____ red. (Use *is* and *has* in appropriate blanks)

A comparison of the results of the two groups was made to evaluate the effectiveness of the proposed method.

The students' overall performance was evaluated qualitatively through teacher-student classroom discussions, one-to-one interactions, and general classroom observation, looking for elements of students' participation, response levels, understanding, and changes in the overall classroom learning atmosphere.

RESULTS AND DISCUSSION

The work presented in this paper is primarily a study of the impact of augmenting the textbook material with the material drawn from OER. Before explaining the statistical data, the author would like to emphasise that this experimental study aimed to assess the student's response and improvement in totality. Hence, the author considered qualitative assessment, as mentioned above, in terms of change in a classroom learning atmosphere, is equally, if not more, essential to make the evaluation more realistic, and discussed it in the paper along with the statistical data from the tests, exercises, etc.

OER provides easy-to-learn resources that can be used for effective ELT. In the case of primary education, particularly in the Indian context, teachers play a significant role in bringing OER to ELT classrooms. As per the International Council for Open and Distance Education (ICDE), OER provides a tremendous opportunity for everyone to share, use, and reuse the world's knowledge" (ICDE, 2006). As OER is still in its early stage in English teaching, there is a lot of scope for generating evidence-based data to establish methods for using OER effectively in augmenting or supplementing the textbook in the Indian context. The work presented in this paper attempts to explore how material taken from OER can be used to improve English language teaching and learning efficiency at the primary level.

Table 1 and Figure 1 present the quantitative assessment results of the students in the two groups. Table 1 gives the number and percentage of students who passed the correct responses during the tests, along with the improvement in the experimental group over the control group in each of the three grammar elements. Figure 1 depicts the relative performance of the two groups as a percentage of the students who gave the correct responses during the tests.

Table 1. Performance of the Control and Experimental Groups.

Grammar Element	Number of students who gave the right response		Percentage of students who gave the right response		Improvement in experimental group (%)
	Control group	Experimental group	Control group	Experimental group	
Order of Adjectives	10	17	50.0	81.0	31.0

Usage of 'is' and 'has'	9	16	45.0	76.2	31.2
Articles	11	19	55.0	90.5	35.5

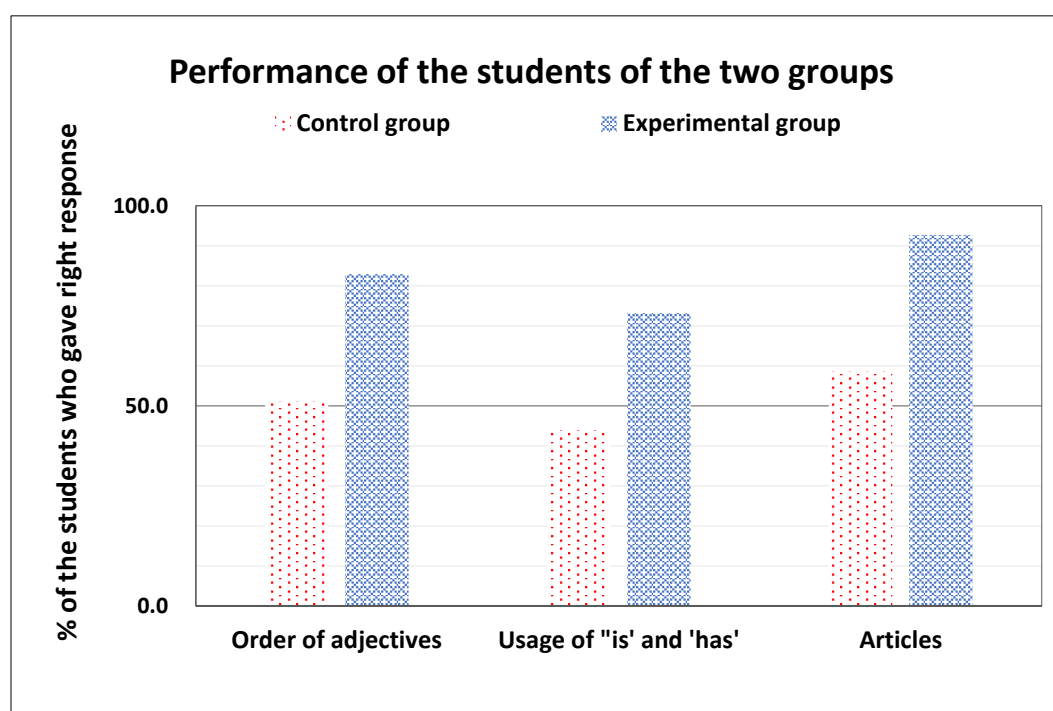


Figure 1: Performance of Control and Experimental Groups

The data clearly shows that the augmentation of the textbook material with the additional material drawn from OER has improved the understanding and knowledge levels of the students in all three grammar elements experimented with at the primary level. Statistically, there was an improvement of about 30% in ‘order of the adjectives’, ‘difference in the usage of *is* and *has*, and about 35% in ‘articles’, reflecting the effectiveness of the proposed educational practice in ELT. This gain attains greater importance when one remembers that the subjects are non-native speakers of the English language.

This remarkable gain in grammatical knowledge can be attributed to three factors: identifying the student’s needs, providing them with contextual explanation and exposure, and multiple exposures, all of which have been backed by extensive research work reported in this field.

Identifying the students’ needs is based on (i) the grammar elements given in the textbook, *order of adjectives* in this study, or (ii) errors commonly made by students as observed during interaction with students and general classroom observation, *Differences in the usage of ‘is’ and ‘has’ and Articles* in this study. This is in accordance with the findings of Andi and Arafah (2017), who conclude that such need-based teaching helps in better designing of teaching material as per the needs of the learners. Further, such a need-based approach develops tailor-made material focussing on students’ needs.

The next step is to teach the students the identified concepts. This needs additional attention as the target students are from the primary level. It is essential to take enough precautions to ensure that the grammar elements are presented in easy-to-understand language, with a simple, logical, and conceptual explanation along with meaning, followed by appropriate usage examples and engaging practice material.

The textbook is undoubtedly the most important source of teaching material. However, because of many natural limitations, such as its size, scope as per the curricular framework and guidelines, and authors' orientation, the textbook may not provide material suitable for catering to the needs of the entire class, especially a heterogeneous class, which is usually the case.

Here comes the role of OER and the teacher. Teaching grammar, especially to English as a second language (ESL) learners, is always challenging to the English teacher because of its very nature. OER offers extensive and rich material for teaching grammar, encompassing many of the features discussed above, which can be effectively exploited to make grammar teaching enjoyable.

However, no single source of OER provides the material that suits the needs of the learners. Hence, it ought to consult various sources to compile the required teaching material depending on the topic, grade, and standards of the target learners, as discussed in the students' needs above. Here comes the teacher's most important role in searching for and collecting suitable material. Accordingly, multiple OERs were consulted, and the material for the selected grammar elements was compiled. One example was already discussed above.

The difference in the performance of the two groups (Table 1) obviously can be related to the augmentation with the material drawn from OER. This tailor-made supplemented material is essential in providing conceptual understanding; multiple exposures and repetitions in the context help the learners better assimilate the concept, producing better results, which is evident from the data. There is enough literature (Chen & Yang, 2020) that endorses the fact that the number and type of exposures positively impact language learning and contribute to improving the absorption and learning of students.

Further, such interventions provide evidence-based input that can be considered for inclusion in classroom practices to improve students' comprehension. Thus, the substantial gains realised in this study prompt the design of tailor-structured material that provides the students with ample opportunities for contextual examples, understanding, and practice. Here, the author emphasises the usage of OER in classroom practices, targeting specific requirements rather than identifying, listing, or discussing the resources. In other words, the author firmly puts forward the view that OER is not the goal but a very effective tool in English language teaching, as demonstrated in this paper. In this context, it is worth mentioning the opinion of Martin Weller, who says, "Open educational practice covers any significant change in educational practice afforded by the open nature of the internet".

OER inherently promotes learner autonomy. However, at the primary level, the students largely, if not solely, depend on the teacher for their learning needs. Hence, teachers play an invaluable role in exploring and providing appropriate material as per the needs of the students with the ultimate objective of improving the student's language skills, which, naturally, is a dynamic and continuous process. Hence, creating awareness of OER,

imparting skills to explore OER, and finally encouraging the usage of OER for classroom practices should be promoted as a part of the professional development of teachers.

McAndrew et al. (2012) point out that it is crucial to consider the impact of OER and the types of evidence generated across initiatives, organisations, and individuals. They further opine, along with other issues, that there is a need to research the ways to design and use resources more openly. As can be seen from the data, the present study aligns with the views of McAndrew et al. (2012). It investigates how to use and adapt OER for English language teaching at the primary level in an Indian context. It provides evidence of the beneficial impact of OER on students' language learning.

To conclude, the work discussed in this paper provides evidence that teachers can create a more engaging and effective English language learning environment by carefully integrating OER with textbook material in selected or challenging areas specific to the needs of the learners.

LIMITATIONS

First, this classroom experiment involving primary-level students is just an initiative. The apparent limitations of this work are a smaller sample size, involving only one school and spanning fewer days. More studies involving more schools and students are to be conducted to get a more reliable extrapolation of the results. Similarly, longitudinal studies throw more light on the efficacy of the method. Resorting to multimedia or interactive material can naturally be expected to increase the efficiency the author plans to take up in the future. Retention studies further help refine the method in terms of choosing the material.

CONCLUSION AND IMPLICATIONS

This paper presents a classroom experimental research work carried out at the primary level to improve the efficiency of the English language teaching-learning process by augmenting the curricular teaching material with the material drawn from OER. The study was conducted in a 5th-class English language classroom of a government primary school in Andhra Pradesh, India. The study indicates that supplementing the textbook with additional material drawn from OER helps improve the efficiency of learning the English language in the case of ESL students with enhanced conceptual understanding and motivation levels. The study involves teaching three selected grammar elements to two groups of students of the same class in two ways, with and without OER augmentation. Some of the factors that contribute to enhanced language learning efficiency through OER augmentation, like students' needs, contextual explanation, multiple exposures, and various resources, were discussed in the paper.

This paper presents a simple and easily adaptable classroom-level practical work that addresses primary-level students' commonly encountered language issues. The flexibility in choosing and presenting material from OER makes this language educational practice suitable for immediate classroom experimentation within regular academic time and curricular limitations and framework. These interventions provide evidence-based input that can be considered for inclusion in classroom practices to improve students' comprehension and learning experience. The results

obtained in this initiative encourage further experimentation with students of different grades and a higher number of lessons to refine and establish the practice. This data prompts the design of tailor-made and re-structured information and exercises for learners who need additional attention. Teaching grammar, particularly to ESL students, is always challenging for English teachers. Here, OER can be used to make grammar teaching effective, interesting, and engaging, as OER provides a vast and rich source of grammar teaching material, which can supplement the textbook material.

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