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Report on Digital Transformation in Higher Education in South Asia

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Report on Digital Transformation in Higher Education in South Asia

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Foreword

How are new technologies changing higher education in South Asia—not just in terms of access and infrastructure, but in how institutions teach, lead, and adapt? How prepared are faculty and university leaders to engage with emerging technologies in ways that are both effective and ethical? And where are national policies succeeding or falling short?

These questions are not abstract. With over 42 million students enrolled in higher education, South Asia is home to some of the most dynamic and diverse university systems in the world. The pandemic accelerated digital uptake across the region, yet it also exposed deep structural inequities, from connectivity and infrastructure to institutional readiness and support. As new technologies continue to shape how knowledge is produced and shared, the choices made today will have lasting implications for equity, quality, and access in the decades ahead.

This report offers a timely and grounded response to this moment of transformation. It examines how digital change is being understood and implemented across diverse institutional and national contexts. Through a regional review and a series of in-depth case studies from Bhutan, India, Nepal, and Sri Lanka, it captures how universities are navigating policy ambition, resource constraints, and day-to-day decision-making. Drawing on interviews with university leaders, department heads, and senior faculty — some of whom are directly responsible for digital systems — the study brings forward the perspectives of those shaping change from within.

Conducted by the UNESCO Regional Office in the framework of SDG4 coordination efforts in the Asia-Pacific and the transforming higher education agenda, this report reflects UNESCO's commitment to support evidence-based policy dialogue, building institutional capacity, and promoting equitable and quality-driven digital transformation in higher education. It will inform SDG4 coordination and acceleration efforts under the Learning and Education 2030+ Networking Group, which is part of the UN Regional Collaborative Platform working towards Sustainable Development.

The findings of the report are instructive. While disparities in infrastructure and digital skills remain persistent challenges, the report also highlights instances of local innovation, examples of adaptive leadership, and a growing recognition that transformation depends not just on technology, but on strategy, inclusion, and long-term vision.

At UNESCO, we believe that digital transformation must be guided by the principles of equity, inclusion, and the right to quality education for all. Done right, digital transformation can accelerate progress toward Sustainable Development Goal 4 by expanding access, improving quality, and strengthening the resilience of higher education systems. That means supporting institutions to develop the leadership, capacity, and pedagogical approaches needed to ensure that digital change leads to meaningful learning for all.

We are proud to have supported this report in partnership with UNESCO-ICHEI. Let it serve as both a reference and a prompt for reflection, for policy dialogue, and for building higher education systems that are more inclusive, resilient, and ready for the futures we face.

Soohyun Kim

Regional Director

UNESCO Regional Office in Bangkok and Office for UN Coordination in the Asia-Pacific

Foreword

In recent years, with the rapid growth of digital technologies and increasing interconnectedness of the global community, the landscape of higher education in South Asia has undergone a profound transformation. The integration of information and communication technologies (ICT) has prompted a critical reevaluation of traditional educational models, leading to new paradigms that prioritise flexibility, accessibility, and personalised learning. These shifts have created unprecedented opportunities for students to engage in education, collaboration, and skill development, equipping them to meet the evolving demands of the 21st century.

However, this digital evolution is not without its challenges. Issues such as the digital divide, disparities in access to technology, and the need to balance the roles of technology and human educators have emerged as critical concerns requiring careful attention. As we navigate this complex landscape, the importance of inclusive governance, adaptable educational strategies, and a steadfast commitment to equity cannot be overstated.

Against this backdrop, the report titled *Digital Transformation in Higher Education in South Asia* has been developed. Prepared by a consortium of experts and practitioners from across the region, this report synthesizes insights from a wide range of initiatives in South Asian countries, focusing on Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. It highlights the diverse practices and innovative approaches that have emerged in response to the challenges and opportunities presented by digitalisation.

Through a systematic analysis of policy frameworks, institutional case studies, and capacity-building initiatives, this report presents an in-depth overview of the current state of digital education in South Asia. Grounded in a practice-oriented perspective, this report aligns strategic insights with the practical needs of educators and learners, providing an actionable framework to foster meaningful and sustainable educational change.

As South Asia embarks on this transformative journey, we firmly believe that the insights and recommendations presented in this report will serve as valuable resources for policymakers, educators, and stakeholders. May it guide efforts to pave the way toward a brighter and more equitable future for higher education in South Asia.

Jin Li

Director of UNESCO-ICHEI

Acknowledgements

This study is but a snapshot of a rapidly evolving landscape. We hope it contributes to the broader dialogue on educational innovation in the region. This research would not have been possible without the support, collaboration, and insights of numerous individuals and institutions across South Asia. We would like to acknowledge their commitment to advancing a deeper understanding of digital transformation in higher education.

This research was made possible through institutional support from the International Centre for Higher Education Innovation under the auspices of UNESCO (UNESCO-ICHEI).

This report was submitted by the Centre of Excellence in Teacher Education (CETE), School of Education (SoE), Tata Institute of Social Sciences (TISS), Mumbai, India. We are extremely grateful to Anil Mammen and Vinay Lautre, the authors of the report, and to Dr. Amina Charania, Associate Professor, Centre of Excellence in Teacher Education, for guiding us through the early stages of this research and providing critical methodological insights. We would also like to sincerely thank the research assistants, Sanchita Mondal and Jayanth N V, for assisting with interviews, diligently transcribing them, and shaping the case studies; Shalini Amin and Reshma Balakrishnan for their immense support during the literature review; and Kiruthiga MP for coordinating the Nepal and Sri Lanka interviews.

We extend our deepest gratitude to the faculty members from public universities in India, Sri Lanka, Nepal, and Bhutan who generously shared their time, experiences, and perspectives. Their candid reflections and insights form the heart of this study, which attempts to illustrate a nuanced understanding of digital transformation in higher education in South Asia.

We would also like to express our sincere thanks to the university vice chancellors and/or administrators who facilitated access to the relevant faculty. Their support was invaluable.

We would also like to gratefully acknowledge the coordination of the Education Section team of the Regional Office in Bangkok as well as the contributions of our colleagues from the UNESCO Regional Office in Delhi, and UNESCO Offices in Kathmandu and Dhaka, who provided valuable country insights to help review, contextualize and enrich the study.

Disclaimer

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Acronyms

AI - Artificial Intelligence
AISHE- All India Survey on Higher Education
AR - Augmented Reality
BAC - Bhutan Accreditation Council
BIPS - Bhutan ICT Policy and Strategies
COVID - Coronaviraus Disease
DAHE - Department of Adult and Higher Education
DTH - Direct to Home Channels
EdTech - Education Technology
ESP - Education Sector Plan
FOSSEE - Free and Open-Source Software for Education
GPI - Gender Parity Index
GPT - Generative Pre-trained Transformer
HEIs - Higher Education Institutions
ICT - Information and Communication Technologies
IT - Information and Technology
ITSM - IT services and management committee
KGUMSB - Khesar Gyalpo University of Medical Sciences of Bhutan
LEARN - Lanka Education and Research Network
LMS - Learning Management Systems
MAXQDA - MAXimum Qualitative Data Analysis
MOEST - The Ministry of Education, Science, and Technology, Nepal
MOOC - Massive Open Online Course
MOODLE - Modular Object-Oriented Dynamic Learning Environment
MOU - Memorandum of Understanding
NCRI - National Centre for Research and Innovation, Bhutan
NDEAR - National Digital Education Architecture, India
NEHEP - Nurturing Excellence in Higher Education Program, Nepal
NETF - National Educational Technology Forum, India
NKN - National Knowledge Network, India
NMEICT - National Mission on Education through ICT, India
NOU - The Nepal Open University, Nepal
NPTEL - National Programme on Technology Enhanced Learning, India
NRF - National Research Foundation, India
ODL - Open and Distance Learning
OPAC - Open Publie Access Catalogue
OSCAR - Open-Source Courseware Animations Repository
RUB - Royal University of Bhutan, Bhutan
SWAYAM - Study Webs of Active-learning for Young Aspiring Minds
TEB - Tertiary Education Board, Bhutan
TU - Tribhuvan University
TVET - Technical and Vocational Education and Training
UMSB - University of Medical Sciences Act of Bhutan
VR - Virtual Reality

Preface

This report on digital transformation in higher education in South Asia reflects the recognition that digitalisation is not merely about implementing or upgrading technologies. Rather, it is about reimagining how knowledge creation, dissemination, and engagement take place in an environment powered by traditional as well as emerging technologies.

To guide this analysis, we adopted the Jisc Framework for Digital Transformation in Higher Education (2023) as the theoretical framework to guide the analysis through digital cultures, knowledge management, and technological infrastructure. The framework consists of six dimensions: (1) Organisational digital culture, (2) Knowledge creation and innovation, (3) Knowledge development, (4) Knowledge management and use, (5) Knowledge exchange and partnerships, and (6) Digital and physical infrastructure. By aligning the study with this framework, this report drew upon an extensive literature review and policy analyses, enabling us to map existing trends and challenges in digital transformation. The framework has provided a structured lens to explore the deeper systemic changes required in higher education across South Asia instead of examining only the nature of technological interventions.

Building on this theoretical foundation, this research adopts a multi-country exploration of digital readiness, challenges, and opportunities in South Asia. Using a multimodal qualitative case study approach, we have sought to capture the varied experiences of faculty from public universities in Bhutan, India, Nepal, and Sri Lanka. Through triangulating interview data with document analysis, this report aims to provide a nuanced understanding of digital transformation within diverse national and institutional contexts.

Each national context presents unique policy landscapes, institutional cultures, and technological ecosystems. Guided by Creswell and Poth's (2017) approach to case study research, this methodology allows us to acknowledge these differences while identifying broader regional patterns and insights.

Digital transformation is a continuous journey of adaptation, learning, and innovation in the face of contextual challenges. This study is not a definitive blueprint – rather, it is an invitation to further conversations on policies related to educational technology and collaborative reimagination of higher education in the digital age.

We hope this report will serve as a valuable map for educators and policymakers to design meaningful and contextually relevant interventions.

Executive Summary

This report examines digital transformation in higher education across South Asia, with a focus on Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka. By employing the Jisc Framework for Digital Transformation (Jisc, 2023) and a multimodal qualitative case study approach, this study assesses technological integration in higher education in the context of critical trends, challenges and opportunities across the region.

The literature review and document analysis provide a systematic analysis aligned with the Jisc Framework, providing structured insights into digital transformation in higher education in all six countries. The case studies, which focus on Bhutan, India, Nepal and Sri Lanka, uncover diverse perspectives on digital transformation processes in higher education. Through semi-structured interviews with key stakeholders, including university department heads and senior faculty – some of whom were directly responsible for digital technology systems, the research captures ground-level realities and institutional experiences.

The findings reveal an uneven landscape of digital transformation across the region. Leadership and policy implementation emerge as crucial determinants of success, with significant variations observed between national approaches. For instance, India demonstrates advanced policy frameworks, particularly in states like Kerala and Maharashtra, while Bhutan showcases strong national-level digital integration. In contrast, Nepal and Sri Lanka, in contrast, highlight certain challenges in policy implementation and systematic digital adoption.

Faculty development and cultural contexts present another critical dimension. A significant generational divide in technology adoption was evident, although the COVID-19 pandemic acted as a catalyst for accelerated digital integration across all age groups. The study underscores the urgent need for continuous professional development programmes and highlights varying levels of faculty readiness across different institutional and national contexts.

Infrastructure and technology adoption also reveal specific stark disparities in digital investments. Indian institutions lead in advanced technological infrastructure, while Bhutan and Nepal face geographic and economic constraints. Notably, the adoption of cost-effective, open-source platforms is emerging as a strategic response to resource limitations.

The integration of innovation and emerging technologies remains in its nascent stages across the region. Despite isolated instances of innovative practices, such as Sri Lanka's use of analytics for student engagement monitoring, there is a pressing need for strategic roadmaps aligned with global educational technology trends. The research identifies a significant gap in systematically incorporating advanced tools like artificial intelligence (AI) and data analytics into higher education curricula.

Resource constraints remain a persistent challenge, with institutions relying heavily on government funding. The study highlights the variations in resource mobilisation capabilities. Indian universities demonstrate relatively greater

autonomy in securing and diversifying funding compared to institutions in Bhutan, Nepal and Sri Lanka.

Based on these findings, the research proposes tiered recommendations spanning short-term, medium-term, and long-term strategies. These recommendations focus on tailoring policies to institutional contexts, strengthening cybersecurity frameworks, initiating targeted faculty training, expanding international partnerships, investing in robust digital infrastructure and developing sustainable models.

- **Short-term:** Implement targeted faculty training programmes, ensure cybersecurity compliance, expand digital learning access for disadvantaged students, and develop regional knowledge-sharing networks.

- **Medium-term:** Invest in digital infrastructure development, enhance university-industry collaboration, reform curricula to incorporate digital competencies, strengthen cross-border academic mobility and research partnerships, and implement e-learning accreditation and digital certification policies.

- **Long-term:** Develop sustainable funding models for digital transformation, create regional technology-enabled research hubs, draft a unified South Asian digital education policy, and enable evidence-based policymaking informed by analytics.

- **Special Focus (Faculty Development):** Launch a Digital Teaching Excellence Initiative, establish structured mentoring programmes pairing tech-proficient faculty with peers needing support, offer workload management support and flexible online teaching schedules to promote faculty well-being, and develop regional digital competency frameworks.

While challenges persist, the study highlights transformative opportunities. By adopting context-sensitive, collaborative approaches, South Asian higher education institutions (HEIs) can navigate digital transformation more effectively. Prioritising faculty development, inclusive infrastructure, and ethical technology integration will be critical to ensuring a sustainable and equitable digital future for higher education in the region.

Introduction

Several studies across the globe have established the relationship between the quality of education and the integration of digital technologies in higher education (Rahman, 2020). For example, emerging tools like the Internet of Things and social media have optimised teaching and learning processes, enhanced higher education experiences (Haleem et al., 2022), and fostered 21st-century skills in educational settings (Dede, 2010). Given the vast scale of higher education in South Asia, it is critical that digital technologies are implemented at scale for broader access. As a result, Massive Open Online Courses (MOOC), blended learning, and digital resource platforms using distance technologies have become significant, especially in the COVID-19 pandemic and post-COVID-19 period.

According to the World Bank, the economic growth of a country increases by 1.3% with a 10% increase in its Internet speed (Minges, 2016). In South Asia, both commercial and educational/research Internet networks – such as the Trans-Eurasia Information Network – have significantly expanded connectivity (Ali, 2017).

However, mere access to digital technologies and Internet penetration do not automatically warrant meaningful use. Pedagogy approaches have struggled to keep pace with technology proliferation and innovations (Okoye, et.al., 2023; OECD, 2015). Inadequate digital skills among students and teachers continue to be an obstacle to integration across the globe, regardless of a country's level of development (UNESCO, 2021). Furthermore, factors such as teacher capacity building and teacher beliefs about digital technologies (Ertemer, 1999) require deeper exploration in higher education. The rise of generative AI also demands urgent research on its integration into teaching, learning, and assessment processes.

This study focuses on digital technologies in South Asia's higher education context. With over 42 million students enroled in approximately 50,000 HEIs across the region's eight countries[1], South Asia is the world's second-largest region for tertiary education enrolment (World Bank, 2014). The diffusion of digital technologies for quality at scale in higher education in South Asia gained momentum during the COVID-19 pandemic.

Although digital technologies adopted during the COVID-19 pandemic were initially aimed at mitigating immediate issues of access and continuity of education, many practices have since been sustained, while others have been discontinued. This post-pandemic landscape – including the sustenance or rejection of digital tools – requires careful study to understand their long-term value amid emerging and disruptive technologies shaping education, knowledge society, and the economy.

Objectives of the Study

The goal of the study is to contribute to the broader understanding of how digital transformation is shaping higher education in South Asia. Specifically, it aims to answer the following research questions:

1. What are some of the notable trends and developments in digital technologies that have influenced and transformed teaching, learning, and institutional practices in South Asia higher education over the past decade?

[1]The eight countries include India, Bangladesh, Pakistan, Nepal, Afghanistan, Sri Lanka, the Maldives, and Bhutan.

2. What gaps exist between national or state-level policies on digital transformation and implementation? How do institutions address these challenges?

3. To what extent are higher education leaders and faculty prepared to adopt emerging technologies like AI, and what opportunities and challenges do they perceive in this process?

To answer these research questions, this study analysed existing literature, policies, and frameworks from Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. The case studies, however, focus specifically on Bhutan, India, Nepal, and Sri Lanka to provide in-depth insights.

Methodology

The research used a multimodal qualitative case study approach combined with document analysis. By integrating these methods, the study captured nuanced perspectives on the culture and institutional environment shaping digital transformation (Sage Research Methods Community, 2018). Document analysis, a systematic method for analysing and interpreting policy papers, reports, and books, can provide a critical lens to gain meaning and understanding of the various documents (Yin, 2009). In this study, policy documents were often identified and suggested by case study participants[2].

The literature review and analysis of policy documents set the stage for the study to explore the impact of digital technologies on HEIs systemically at the national and regional levels. This approach enabled the identification of challenges and opportunities in teaching-learning practices, while also informing evidence-based recommendations to enhance accessibility, equity, and quality in the South Asia region[3].

Theoretical Framework

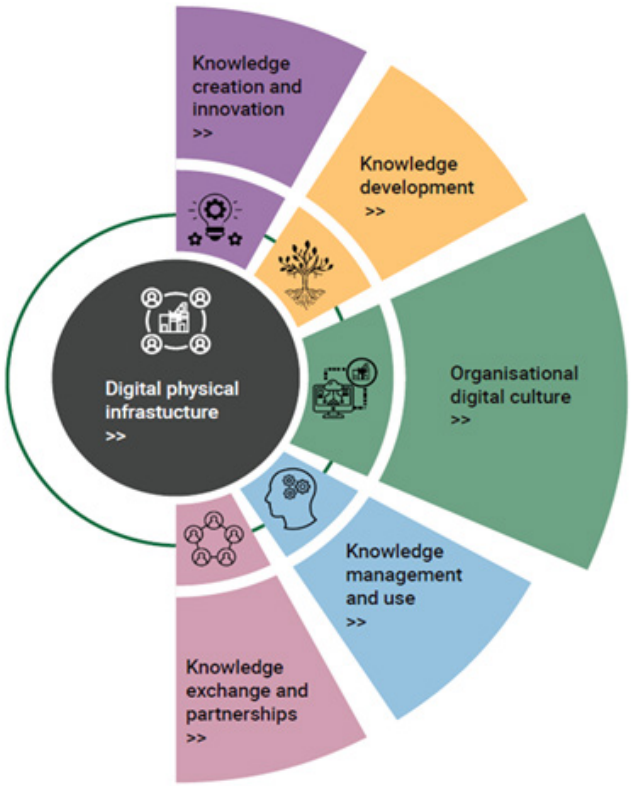

Figure 1 Theoretical Framework for Digital Transformation in Higher Education[4]

[2]The detailed methodology and case studies can be found in Appendix 2.
[3]A comprehensive literature review and document analysis can be found in Appendix 1.
[4]Jisc (2023). Framework for Digital Transformation in Higher Education. https://www.jisc.ac.uk/guides/framework-for-digital-transformation-in-higher-education

The methodology and analysis were guided by the Jisc Framework for Digital Transformation in Higher Education (2023), which adopts a knowledge practices approach to evaluate systematic change. This framework provides a structured lens to examine the intricacies and scale of challenges in implementing digital strategies while also clarifying the roles and responsibilities of stakeholders in HEIs in the South Asia region.

The framework involves the following components:

Table 1 Components of the Framework for Digital Transformation in Higher Education

1	**Digital Culture**	focuses on how attitudes, behaviours, beliefs, and practices affect interactions with digital technologies and their impact on organizational activities. It also involves stakeholder approaches to innovation, teamwork, information sharing, and digital content production and use, enhancing work and learning. The key principles are inclusivity, continuity, leadership, futures thinking, and governance.
2	**Knowledge Creation and Innovation**	involves analysing how emerging trends and developments in techhology inform policy and the role they play in enhancing knowledge creation and innovation through research and collaborative activities.
3	**Knowledge Development**	covers curriculum development, digital teaching and learning as well as learner experiences. The goal is to enable all stakeholders to learn, work, and thrive in a digital environment by rethinking and improving digital learning, teaching ,and assessment.
4	**Knowledge Management**	is about enhancing data usage and access across the institution - including teaching and research - to support decision-making. This also covers ethical use, quality, security and compliance around all types of data.
5	**Knowledge Exchange**	involves improving the processes and practices of communication and partnership, including sharing critical organizational messages, encouraging cooperation with partners and stakeholders, and engaging the community.
6	**Digital Infrastructure**	is about investing in and maintaining a robust and secure infrastructure with expertise, vision and standards compliance. It also involves ensuring digital connectivity within the organization and with external networks.

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Findings

Dimension 1: Organisational Digital Culture
Dimension 2: Knowledge Creation and Innovation
Dimension 3: Knowledge Development
Dimension 4: Knowledge Management and Use
Dimension 5: Knowledge Exchange and Partnerships
Dimension 6: Digital Infrastructure

Findings

The findings from the study were derived from the case studies and document analysis, categorised according to the Jisc Framework for Digital Transformation in Higher Education (2023).

Dimension 1: Organisational Digital Culture

Organisational digital culture is a foundational dimension of digital transformation in higher education. It encompasses the collective mindset, values, and organisational identity that shape how institutions embrace digital technologies. This dimension reflects institutional approaches to digital safety, well-being, and organisational adaptability to change.

1.1 Leadership

Leadership plays a pivotal role in driving digital transformation by setting institutional priorities and securing funding for digital initiatives. In India and Bhutan, national education policies and government funding have facilitated structured digital adoption. For example, Indian universities in states such as Kerala and Maharashtra have been proactive in integrating open-source platforms and establishing dedicated IT governance bodies to manage digital strategies and infrastructure. Similarly, Bhutan has taken a more centralised approach, ensuring that digital transformation aligns with national education goals.

However, in Nepal and Sri Lanka, further efforts may be needed to enhance leadership engagement and strengthen strategic alignment between institutional and national levels. While universities have introduced isolated digital initiatives, a lack of overarching policies and funding constraints hinder sustained adoption.

The COVID-19 pandemic acted as a catalyst, forcing rapid digital adoption. However, institutions without pre-existing digital strategies struggled with long-term sustainability, as temporary measures such as emergency remote teaching were not integrated into broader institutional frameworks. This underscores the importance of leadership-driven digital transformation that extends beyond crisis response and embeds digital practices into long-term institutional planning.

1.2 Faculty Engagement

Faculty engagement is another critical factor in the success of digital transformation efforts. However, adoption patterns vary widely across institutions. Junior faculty members are generally more receptive to Learning Management Systems (LMS), AI-powered tools, and blended learning models. They are able to integrate these technologies and tools effectively into their teaching practices. Conversely, senior faculty often exhibit reluctance, citing a lack of formal training, inadequate institutional incentives, and concerns over increased workloads.

While many universities in the region have introduced faculty development programmes related to technology integration, their effectiveness and accessibility differ significantly. In **India** and **Sri Lanka**, structured digital pedagogy workshops and online certification programmes have been introduced, enabling educators to enhance their digital literacy skills. However, in **Nepal** and **Pakistan**, such initiatives remain sporadic, with limited institutional support for sustained faculty development.

Another challenge is workload distribution – faculty members often face pressure to adopt digital tools without corresponding reductions in other responsibilities. Ensuring institutional incentives, such as promotions, research grants, or workload adjustments, can significantly enhance faculty engagement with digital education models.

1.3 Institutional Support

Students in South Asia have shown high adaptability to digital learning, particularly in institutions that provide structured support systems. For instance, universities in India, the Maldives, and Sri Lanka have established dedicated student support centres that assist with technical troubleshooting, digital literacy training, and access to online learning resources.

However, students in rural and economically disadvantaged areas continue to face persistent accessibility challenges across South Asia. Poor Internet connectivity, high data costs, and limited access to digital devices continue to hinder participation in online learning. In Bhutan and Nepal, students from remote regions often rely on mobile-based learning platforms and government-supported digital literacy programmes to bridge the gaps. Despite these efforts, the digital divide remains a significant barrier to equitable education.

Key Regional Trends and Implications

- High variation in Internet penetration rates[5] across the region (ranging from 51.3% in Nepal to 85.8% in the Maldives) indicates different stages of digital readiness
- While there is strong policy support across all countries, implementation challenges persist
- There is growing recognition of digital transformation as a strategic priority rather than a mere technological upgrade
- Rather than focusing only on technology infrastructure, there is increasing attention on developing a broader digital ecosystem

Challenges and Opportunities

Outlined below are some of the challenges and opportunities observed with regard to a digital mindset, organisational identity, organisational change, and organisational well-being.

Challenges

Digital Mindset

- In some contexts, faculty members may demonstrate a stronger inclination toward traditional lecture-based instruction, which can present challenges in encouraging the integration of digital tools
- Limited adoption of digital tools for teaching activities beyond basic tasks, as faculty primarily use technology for general purposes rather than deeper pedagogical applications
- A generational divide in technology adoption, with senior faculty members showing less proficiency and willingness to embrace digital tools
- Cultural preferences for traditional face-to-face learning methods, as noted in Nepal's higher education system

Organisational Identity

- Disparity in digital adoption between public and private institutions, particularly in Pakistan, where private universities show significantly higher technology integration
- Inconsistent digital transformation across different departments and faculties within the same institution, as observed in Sri Lankan universities
- Lack of unified digital identity across institutions, making cross-institutional collaboration challenging
- Difficulty in maintaining institutional uniqueness while adopting standardised digital platforms

Organisational Change

- Limited institutional leadership support for digital transformation, as highlighted in Nepal's ICT implementation challenges
- Absence of clear change management strategies in implementing digital initiatives
- Slow pace of policy implementation, evident in the gap between policy formulation and execution across all countries
- Resistance to structural changes required for digital transformation

Organisational Well-being

- Digital fatigue among faculty and students, particularly observed during rapid digital adoption phases during the COVID-19 pandemic

[5]The Internet penetration rate corresponds to the percentage of the total population of a given country or region that uses the Internet.

- Stress related to continuous technology upgrades and skill enhancement requirements
- Work-life imbalance with increased digital engagement
- Cybersecurity concerns affecting institutional well-being, as mentioned in the Maldives' policy focus

Opportunities

Digital Mindset

- Growing acceptance of blended learning approaches, particularly evident in Sri Lanka's education framework and in India
- Increasing recognition of digital literacy as a core competency, as shown in Bhutan's focus on digital skills
- Emergence of digitally proficient faculty within institutions who can lead digital transformation

Organisational Identity

There is potential for HEIs to:

- Establish a unique digital presence in institutions through innovative programmes
- Develop distinctive digital learning environments, as seen in India's Digital University initiative
- Establish leadership in specific digital domains, as demonstrated by India's AI initiatives

Organisational Change

- Support from national policies and frameworks for digital transformation, particularly strong in India's National Education Policy 2020 and the Maldives' education policy
- Availability of international collaboration opportunities for digital transformation
- Potential for institutional restructuring to better align with the requirements of the digital age
- Opportunity to develop new organisational models based on digital integration

Organisational Well-being

There are opportunities for HEIs to:

- Improve work efficiency through digital tools
- Create more inclusive and accessible learning environments, as highlighted in Nepal's Open and Distance Learning (ODL) Policy
- Improve better work-life balance through flexible digital working arrangements
- Develop comprehensive digital wellness programmes

Dimension 2: Knowledge Creation and Innovation

Knowledge creation and innovation represent a critical domain within the digital transformation framework for HEIs. This dimension focuses on emerging trends in technology across operations to guide policy development and strategic initiatives. It involves the institution's capability to leverage digital technologies for advancing research and collaborative innovation, while considering broader societal impact at local, regional, national, and international levels. Key aspects include digital vision and horizon scanning, research, innovation, and impact.

2.1 Digital Vision and Horizon Scanning

Digital vision and horizon scanning play a crucial role in shaping the future of higher education in South Asia. However, South Asian countries face distinct challenges. In **Bhutan**, fragmented research efforts and limited institutional knowledge-sharing hinder progress. Similarly, **Pakistan** faces a persistent gap between policy vision and implementation, resulting in a misalignment of research priorities and resource allocation. In **Nepal**, the focus remains primarily

on establishing basic infrastructure, which, while essential, diverts attention from potential investments in emerging technologies. Addressing these gaps requires structured policies that enable institutions to anticipate technological trends and align research efforts with national development goals.

2.2 Research

The research landscape in South Asia faces significant barriers related to funding, infrastructure, and accessibility. For example, **Pakistan** struggles with limited funding opportunities, which hinders the expansion of a strong research culture. However, initiatives such as Pakistan Research Repository, a comprehensive digital archive established by the Higher Education Commission to provide open access to doctoral and master's theses from Pakistani universities, enable global dissemination of the country's academic research output. **India** has established the National Research Foundation (NRF) to advance AI research.

Bhutan, despite its growing academic sector, lacks standardised protocols for research documentation, making it difficult to track and validate scholarly contributions. To address this, the state has proposed a National Centre for Research and Innovation (NCRI).

To overcome these challenges, South Asian nations need to prioritise investment in national research repositories, such as Pakistan Research Repository. Expanding access to open educational resources (OER) and digital archives can also enhance research output and global engagement.

2.3 Innovation

Innovation efforts across South Asia vary widely, with some countries making significant strides while others face persistent hurdles. **India**'s Free and Open-Source Software for Education (FOSSEE) initiative exemplifies efforts to bridge the gap between policy and digital learning practices. However, the scalability of this initiative remains a concern. **Pakistan** continues to struggle with weak industry-academia collaboration, limiting opportunities for applied research and innovation-driven economic growth. **Nepal**, with its lack of experimental test-bed facilities, faces constraints in validating new technological advancements at scale.

Despite these challenges, promising initiatives highlight opportunities for scalable innovation. For example, **India**'s Virtual Labs promote interactive learning through simulation-based platforms. **Nepal**'s emphasis on preserving traditional skills through digital means further demonstrates how technology can be leveraged to sustain cultural heritage while fostering innovation. **The Maldives** has also taken steps to enhance industry-institution collaborations, particularly in data analytics, paving the way for more research-driven economic development.

2.4 Wider Impact

The broader impact of knowledge creation and innovation in South Asia extends beyond academic institutions to national and regional economic development. **Pakistan**'s emphasis on **i**nternship programmes in cutting-edge technologies aims to bridge the skills gap and create a more industry-ready workforce. **Sri Lanka** has integrated creativity and problem-solving into its educational frameworks, ensuring that students develop competencies that align with future technological demands. **The Maldives'** commitment to leveraging data analytics in education research also underscores the increasing role of technology in shaping policy decisions. The growing digital infrastructure across the region provides an opportunity to scale innovation-led economic growth, ensuring that research and technological advancements translate into tangible societal benefits. Strengthening collaboration, as seen in Sri Lanka's LEARN network, can further enhance regional knowledge exchange and drive sustainable development.

Key Regional Trends and Future Directions

- The increasing role of research and innovation as key drivers of digital transformation
- The expanding use of digital tools to enhance research collaboration and knowledge-sharing
- A growing focus on cross-border research initiatives to improve regional academic engagement
- The development of strategic partnerships between academia, industry, and government bodies to accelerate innovation

Challenges and Opportunities

Challenges

Digital Vision and Horizon Scanning

- Limited long-term strategic planning for emerging technologies, as evident in Nepal's primary focus on basic infrastructure
- Lack of systematic approaches to monitoring and anticipating technological trends, particularly visible in Bhutan's need for formal protocols
- Gap between policy vision and implementation capabilities, as seen in Pakistan's digital transformation Challenges
- Insufficient mechanisms to assess and prepare for the future digital needs of institutions

Research

- Limited funding for research initiatives, as highlighted across multiple countries
- Lack of standardised protocols for research documentation and sharing, specifically mentioned in Bhutan's case
- Insufficient collaboration between institutions for research purposes

Innovation

- Limited support for experimental validation at scale, as noted in India's gaps between policy and practice
- Insufficient facilities to support large-scale experimental test beds
- Lack of a collaborative and interdisciplinary approach in innovation initiatives
- Limited integration between industry needs and academic innovation, particularly highlighted in Pakistan's case

Wider Impact

- Challenges in connecting research outputs with stakeholders and practitioners
- Limited mechanisms for measuring and analysing the impact of research and innovation
- Insufficient platforms for disseminating research findings to diverse audiences
- Gap between research outcomes and practical applications

Opportunities

Digital Vision and Horizon Scanning

- Strong policy frameworks supporting digital transformation, particularly evident in India's National Education Policy 2020 and the Maldives' education policy
- Potential for regional collaboration in educational technology
- Growing recognition of emerging technologies like AI, as shown in India's National Strategy for AI
- Opportunity to develop comprehensive digital roadmaps aligned with national development goals

Research

- Development of national research repositories, as demonstrated by Pakistan Research Repository
- Potential for cross-border research collaboration through digital platforms
- Growing focus on research and innovation in national policies
- Opportunity to leverage digital tools for research enhancement, as seen in Sri Lanka's LEARN network

Innovation

- Emerging focus on entrepreneurship and innovation in higher education

- Potential for developing innovation hubs and incubators
- Growing emphasis on industry-academia partnerships
- Opportunity to leverage traditional knowledge through digital means, as highlighted in Nepal's policies

Wider Impact

- Growing digital infrastructure for disseminating research and knowledge creation
- Opportunity to influence policy through research findings
- Growing emphasis on the social impact of emerging technologies

Dimension 3: Knowledge Development

Knowledge development within HEIs involves reimagining and improving digital learning, teaching, and assessment. It covers aspects of curriculum development, digital learning, digital teaching, and learner experience (Jisc, 2023).

3.1 Curriculum Enhancement and Digital Learning

The integration of digital learning materials and online course offerings has gained momentum across South Asia, driven by national policies and institutional initiatives. In **India**, the National Education Policy 2020 explicitly encourages blended learning modes, leading to an expansion of digital course offerings in universities. Institutions such as the Indian Institute of Technology (IIT) Bombay have developed Virtual Labs, enabling students to engage with interactive simulations for science and engineering disciplines. Meanwhile, **Sri Lanka**'s LEARN network has played a critical role in facilitating digital curriculum integration, particularly for distance learning programmes.

However, there are significant challenges in ensuring curriculum standardisation across the region. In **Nepal**, universities struggle to integrate digital content into traditional curricula, primarily due to insufficient instructional design expertise and faculty training. Similarly, in **Bhutan**, the development of digitally enhanced courses has been inconsistent across institutions, leading to variations in digital education quality. Addressing these gaps requires stronger collaboration between policymakers and academic institutions to establish clear guidelines for digital curriculum development.

3.2 Skill Development

Continuous skill development for both faculty and students remains a pressing need across the region. In **the Maldives**, educational institutions have prioritised industry-aligned curriculum reforms, with a strong focus on data analytics and technology-driven education. The Maldives National University has introduced specialised courses to equip students with AI and data science competencies, aiming to bridge the gap between academia and industry demands.

In **India**, the National Mission on Education through ICT (NMEICT), a government programme run by the Ministry of Human Resource Development, aims to make education more accessible and improve the quality of teaching and learning. Study Webs of Active Learning for Young Aspiring Minds (SWAYAM), a free online learning platform developed by the Government of India, offers courses from ninth grade through post-graduation, as well as professional development courses for teachers.

Meanwhile, **Pakistan** has expanded its skill-based learning initiatives, particularly through internship programmes in emerging technologies. The National University of Sciences and Technology has partnered with technology firms to offer hands-on experience in AI and cybersecurity, ensuring that students gain practical knowledge in high-demand fields. Despite these advancements, students in rural areas of **Nepal** and **Bhutan** continue to face challenges in accessing up-to-date learning resources, largely due to limited Internet connectivity and inadequate institutional support.

To address these disparities, universities must invest in faculty development programmes that provide pedagogical training on digital tools and adaptive learning technologies. Expanding OER can also

improve access to high-quality digital content, particularly for students in resource-constrained environments.

3.3 Regional Collaboration for Curriculum Standardisation

Regional collaboration in digital education remains fragmented across South Asia, despite growing efforts to align accreditation and quality assurance standards. India and Sri Lanka have made significant strides in developing regional accreditation frameworks, enabling greater standardisation of online learning standards. The University Grants Commission of **India** has introduced credit transfer policies to facilitate student mobility between institutions, allowing learners to seamlessly transition between in-person and digital courses.

However, the absence of a unified digital education framework across South Asia has led to challenges in credit transferability and online course recognition. For example, universities in **Nepal** and **Bhutan** have expressed concerns about the lack of regional alignment in digital certification policies, making it difficult for students to receive academic recognition for online coursework completed outside their home countries.

Developing a **South Asian Higher Education Digital Standard** could enhance cross-border knowledge sharing and student mobility, ensuring that online learning credentials are mutually recognised across institutions. Encouraging regional partnerships among higher education bodies can also foster collaborative research on digital learning effectiveness and best practices in online pedagogy.

Challenges and Opportunities

Challenges

Digital Learning

- Limited access to digital devices, particularly severe in Sri Lanka, where 50% of students lack proper devices
- Connectivity issues hampering online learning, especially in rural areas
- Cost barriers to accessing digital learning resources, noted across the region
- Language barriers in accessing digital content, particularly highlighted in Pakistan's case

Digital Teaching

- Limited technical competency among faculty, as noted in Pakistan's higher education assessment
- Insufficient training in online pedagogical methods
- Resistance to adopting new teaching methodologies
- Limited understanding of instructional design for online courses compared to face-to-face instruction

Learner Experience

- Digital divide affecting student participation, particularly evident in rural areas
- Limited interaction and engagement in online environments
- Challenges in practical and laboratory work in digital settings
- Accessibility issues for students with disabilities

Curriculum Development

- Slow pace of curriculum modernization to incorporate digital elements
- Limited integration of industry requirements in curriculum
- Challenges in standardising digital literacy components
- Insufficient focus on practical digital skills and emerging technologies

Opportunities

Digital Learning

- Growing availability of MOOC platforms, as seen in Nepal's digital initiatives and India's SWAYAM
- Potential for personalised learning through technology
- Opportunity to leverage mobile learning, given high smartphone penetration
- Development of multilingual digital content
- Integration of emerging technologies like augmented reality (AR) and virtual reality (VR), as proposed in Nepal's framework

Digital Teaching

- Development of blended learning approaches, as emphasised in Sri Lanka
- Opportunity for standardised quality in teaching through digital platforms
- Growing acceptance of digital assessment methods

Learner Experience

- Enhanced accessibility through digital platforms
- Opportunity for self-paced learning
- Integration of interactive and gamification elements, as proposed in Nepal, as well as through the use of AR, VR, and AI
- Potential for improved student support services through technology

Curriculum Development

- Integration of digital literacy across disciplines
- Opportunity to align curriculum with industry needs
- Development of flexible course structures
- Potential for regional curriculum collaboration
- Integration of emerging technologies in curriculum development

Dimension 4: Knowledge Management and Use

4.1 Digital Repositories and Open Access

The expansion of digital repositories across South Asia has significantly improved access to academic research and OER. Pakistan Research Repository, maintained by the Higher Education Commission **Pakistan**, serves as a central platform for archiving research outputs, making them accessible to both local and international audiences. Similarly, **India**'s National Digital Library, developed by the Ministry of Education with over 30 million resources, provides a vast collection of open-access scholarly materials catering to researchers and students across disciplines. E-Shodhsindhu, a consortium established by the Ministry of Education in India, provides academic institutions with access to a wide range of electronic resources, including peer-reviewed journals, bibliographic databases, and factual databases. It acts as a single point of access for researchers and students to high-quality scholarly content across various disciplines. In addition to these initiatives, the National Digital Education Architecture (NDEAR) in **India** aims to create a unified digital infrastructure for India's education system, improving accessibility and interoperability of educational tools and resources across the entire ecosystem.

However, institutional uptake of these repositories remains inconsistent, particularly in Nepal and Bhutan, where universities lack well-structured digital archiving policies. In **Nepal**, faculty members often rely on individual institutional servers to store research materials, resulting in fragmented access to knowledge resources. **Bhutan**'s institutions face technical and financial limitations that hinder the

development of fully functional digital repositories. Without coordinated national policies, the potential of open-access platforms remains underutilised, limiting the overall impact on knowledge dissemination in these countries.

4.2 Data Management and Securitys

As HEIs increasingly rely on digital platforms, ensuring data security and privacy has become a priority. **Sri Lanka**'s National Cybersecurity Strategy aims to establish comprehensive data governance policies, ensuring that institutions safeguard sensitive academic and student data from breaches and cyber threats. Similarly, **India**'s proposed Data Protection Bill outlines strict data storage regulations, requiring academic institutions to comply with national guidelines for secure data management.

Despite these efforts, several challenges remain. Universities in Pakistan and Nepal lack dedicated IT security frameworks, exposing them to potential cyber threats and data vulnerabilities. Many institutions in **Bhutan** and **the Maldives** operate with outdated security infrastructure, making them susceptible to unauthorised access and data breaches. Moreover, limited cybersecurity training programmes for university staff in these countries add to the risks, highlighting the need for capacity-building initiatives to strengthen digital security protocols across the region.

To address these concerns, institutions need to invest in comprehensive cybersecurity frameworks that include regular audits, faculty training, and the adoption of end-to-end encryption measures. Collaborative efforts between higher education authorities and national cybersecurity agencies can further ensure that data protection policies align with international best practices.

Challenges and Opportunities

Challenges

Information Management and Use

- Limited digital storage infrastructure, particularly noted in Bhutan's libraries
- Inconsistent systems for information organisation across institutions
- Lack of standardised protocols for information sharing
- Inadequate digital archiving systems, as seen in Pakistan's libraries
- Challenges in maintaining data security and privacy

Data Management and Use

- Limited capacity for large-scale data handling
- Inconsistent data collection practices across institutions
- Lack of standardised data formats and protocols

Business Intelligence

- Limited analytics capabilities in institutions
- Insufficient tools for data analysis and visualisation
- Lack of expertise in interpreting data for strategic purposes
- Gap between data collection and meaningful analysis
- Limited use of data for predictive modelling

Decision-Making

- Limited technology-enabled, evidence-based decision-making culture
- Insufficient integration of data in policy formulation
- Lack of real-time data for quick decision-making
- Gap between data availability and strategic planning

- Limited use of analytics for institutional improvement

Opportunities

Information Management and Use

- Development of national digital libraries, as demonstrated by India's National Digital Library
- Potential for cloud-based information management systems
- Growing emphasis on digital repositories, as seen in the establishment of Pakistan Research Repository
- Opportunity for standardised information management protocols
- Integration of AI for information organisation

Data Management and Use

- Implementation of Education Management Information Systems, as seen in Nepal
- Potential for data-driven educational improvements
- Growing focus on learning analytics
- Opportunity for standardised data collection protocols
- Development of integrated data management systems

Institutional Intelligence and Decision Making

- Potential for predictive analytics in education
- Development of institutional dashboard systems
- Opportunity for enhanced resource allocation through analytics
- Integration of AI for administration as well as academic innovation
- Development of data-driven strategic planning

Dimension 5: Knowledge Exchange and Partnerships

5.1 Academic and Research Collaboration

Academic and research collaboration in South Asia has been expanding, with countries increasingly recognising the importance of regional partnerships. **Sri Lanka**'s LEARN network has played a crucial role in enabling inter-university collaboration by providing high-speed connectivity and shared research platforms for institutions across the country (LEARN, 2019). This initiative has enabled universities to collaborate on joint research projects, share digital resources, and streamline academic communication, improving overall research output. Similarly, **India**'s University Grants Commission collaboration initiatives have focused on facilitating academic mobility, particularly through research exchange programmes and faculty partnerships.

Despite these efforts, cross-border research exchange remains limited due to funding constraints and policy inconsistencies. For example, universities in **Nepal** and **Bhutan** often face bureaucratic challenges in securing international research grants, which limits opportunities for collaborative projects with institutions in India or Pakistan. Additionally, the lack of harmonised accreditation policies in the region makes it difficult for researchers to secure recognition for jointly conducted studies, reducing incentives for cross-border academic engagement.

Efforts to address these challenges include initiatives such as the ASEAN-India Science, Technology and Innovation Cooperation Research Collaboration Fund, which has opened doors for South Asian universities to engage in broader regional research partnerships. However, further institutional alignment and funding mechanisms are needed to enhance sustained cross-border academic cooperation.

5.2 Industry-Academia Partnerships

The integration of academic research with industry needs has been gaining traction in South Asia, particularly in countries that have strong technology-driven economies. India and Pakistan have taken the lead in encouraging industry-academia partnerships, with universities increasingly collaborating with private sector enterprises to develop applied research initiatives. For instance, **India**'s FOSSEE initiative, spearheaded by IIT Bombay, has been instrumental in developing open-source software solutions tailored for educational and industrial applications.

In **Pakistan**, internship programmes in AI and emerging technologies, led by institutions such as the National University of Sciences and Technology, have created direct links between students and industry experts, improving employability and research translation into market-ready solutions. Similarly, the Higher Education Commission of Pakistan's Innovation Fund has encouraged universities to engage in applied research collaborations with industrial stakeholders, resulting in practical solutions in sectors like renewable energy and biotechnology.

In **the Maldives**, the government has introduced collaborative industry-institution research grants, aiming to encourage researchers to work directly with companies to address local economic and technological challenges. This has led to the development of research-driven solutions in marine science and sustainable tourism, reflecting the country's economic priorities. However, smaller economies like **Bhutan** and **Nepal** still struggle with limited private sector investment in research, which hinders their ability to build strong industry-academia linkages. However, it is encouraging to note that the Tertiary Education Policy of Bhutan has proposed an inter-library loan system for resource sharing.

To strengthen industry-academia partnerships across South Asia, governments should consider expanding research incentive schemes, establishing dedicated innovation hubs within universities, and improving cross-border collaboration in applied research projects. Aligning national research priorities with industry needs will ensure that academic research translates into real-world solutions, ultimately driving economic growth and technological advancement in the region.

Challenges and Opportunities

Challenges

Communication

- Limited digital platforms for institutional communication
- Digital divide affecting stakeholder reach, particularly evident in rural areas of Pakistan
- Limited expertise in digital communication strategies

Collaboration

- Limited inter-institutional collaboration frameworks, as noted in Bhutan's case
- Technical barriers to cross-border collaboration
- Insufficient platforms for academic-industry partnerships
- Challenges in resource sharing across institutions

Community Participation

- Digital literacy barriers affecting community participation
- Cultural barriers to online engagement
- Limited awareness of digital participation opportunities

Relationship Management

- Insufficient digital tools for stakeholder relationship management
- Limited capacity for maintaining digital partnerships
- Challenges in tracking and measuring partnership outcomes

Opportunities

Communication

- Potential for multilingual digital communication
- Growing social media presence of institutions
- Implementation of unified communication systems

Collaboration

- Growing networks like Sri Lanka's LEARN initiative
- Development of shared digital resources
- Cross-border educational partnerships
- Industry-academia collaboration platforms

Community Participation

- Digital platforms for community feedback
- Enhancement of alumni networks
- Development of digital communities, with the potential for participatory decision-making

Relationship Management

- Digital platforms for partnership management
- Integration of analytics in relationship management
- Enhanced tracking of partnership outcomes

Dimension 6: Digital Infrastructure

6.1 Connectivity and Digital Access

Ensuring reliable Internet connectivity remains a key challenge in rural and underserved areas across South Asia, particularly in Nepal, Bhutan, and Sri Lanka. **India**'s BharatNet initiative, aimed at connecting villages through high-speed broadband, has made significant progress, but remote educational institutions still report unequal access to stable Internet services. Similarly, Pakistan's Digital Pakistan Vision has led to expanded broadband access in urban centres, but rural regions continue to face connectivity gaps.

In **Bhutan**, digital access in HEIs remains limited due to geographic challenges and dependency on external satellite networks. **Sri Lanka**'s ICT Agency has initiated public-private partnerships to expand digital infrastructure, but affordability concerns persist, limiting students' ability to access online learning resources effectively. In contrast, **the Maldives** has successfully implemented nationwide Internet coverage, allowing for greater integration of digital learning tools in universities.

Bridging the digital divide requires continued investment in national broadband policies and greater regional cooperation to support digital inclusion initiatives. Enhancing affordable Internet access in rural areas and university campuses will ensure that students and faculty can fully participate in the digital education ecosystem.

6.2 Investment in EdTech and AI

South Asia is witnessing a surge in investment in education technology (EdTech) and AI-driven learning solutions, with countries adopting adaptive learning platforms and intelligent tutoring systems. **India** has taken the lead in AI integration in higher education through its National AI Mission, which promotes the use of machine learning and data-driven education models in universities. Leading institutions such as IIT Delhi and IIT Madras have introduced AI-powered education analytics tools to track student engagement and personalise learning experiences.

Sri Lanka and the Maldives have also explored machine learning applications in education analytics, focusing on predicting student performance and curriculum enhancement. **The Maldives** has further leveraged EdTech investments to develop immersive e-learning environments, particularly in subjects requiring simulation-based learning.

Despite these advancements, significant infrastructure gaps remain. Universities in **Nepal**, for example, have expressed difficulties in scaling

AI-based education programmes due to high implementation costs and a lack of faculty training. Similarly, **Pakistan**'s AI-driven learning programmes remain largely confined to selected institutions, with limited integration in public sector universities.

To maximise the potential of AI and EdTech, South Asian nations need to focus on expanding research collaboration, increasing funding for AI-driven educational solutions with ethical and fair use, and developing robust faculty training programmes. Establishing regional AI education research hubs can further accelerate digital transformation in higher education across the region.

Challenges and Opportunities

Challenges

Digital Infrastructure

- Limited funding for infrastructure development, particularly evident in Nepal
- Uneven distribution of resources between urban and rural institutions, as seen in Pakistan
- Inadequate server capacities, specifically noted in Sri Lanka's case
- Limited availability of computing devices
- Power and energy shortages affecting infrastructure reliability, particularly in Pakistan

Digital Connectivity

- Varied Internet penetration rates across the region
- Limited Wi-Fi coverage in educational institutions, as reported in Sri Lanka
- Network congestion affecting service quality
- Connectivity issues in rural and remote areas
- High cost of Internet access and data packages

Digital Support

- Limited technical expertise and support staff
- Limited capacity for system maintenance
- Challenges in providing real-time technical support

Opportunities

Digital Infrastructure

- Growing national investments in digital infrastructure, as seen in India's Digital University initiative
- Potential for cloud-based solutions
- Development of automated systems, as demonstrated in Bhutan's library modernization
- Opportunity for shared infrastructure resources
- Integration of emerging technologies

Digital Connectivity

- Development of educational networks like Sri Lanka's LEARN
- Implementation of Educational Roaming (Eduroam) services for global connectivity, as seen in Sri Lanka
- Potential for public-private partnerships in connectivity
- Growth of mobile Internet accessibility
- Development of high-speed academic networks

Digital Support

- Growing emphasis on technical capacity building
- Development of online support systems
- Implementation of automated support tools

Report on Digital Transformation in Higher Education in South Asia

02

Digital Transformation in Higher Education in South Asia: Insights from Case Studies

Leadership and Policy-Driven Implementation
Cultural Transformation and Faculty Development
Infrastructure and Technology Adoption
Innovation and Emerging Technologies
Resource Constraints and Sustainability

Digital Transformation in Higher Education in South Asia: Insights from Case Studies

Digital transformation in higher education is a complex journey shaped by multiple factors, including each country's socio-economic, political, and infrastructural contexts. In this study, the researchers employed a multimodal case study approach, utilising both written documents and interviews to gain a deeper understanding of the digital transformation process in higher education. Case studies are especially advantageous when trying to understand how and why something happens in real-life situations (Yin, 2009).

Drawing from case studies of Bhutan, India, Nepal, and Sri Lanka, this section synthesises key themes, challenges, and recommendations to provide a comparative understanding of digitalisation efforts across these nations.

Leadership and Policy-Driven Implementation

Leadership commitment emerges as a pivotal factor in the success of digital transformation. Two **Indian** universities highlight the role of strategic organisational frameworks, such as Kerala's bottom-up cluster approach and Maharashtra's IT service management (ITSM) committee, in enabling effective transformation. In **Bhutan**, national leadership has aligned digital goals with broader development plans, integrating ICT policies and cybersecurity measures to create a cohesive framework.

Interviews with faculty in **Nepal** suggested the need for more cohesive national-level policies, while the respondents from **Sri Lanka** emphasised the need to move away from the fragmented adoption of guidelines. These conversations underscored the challenges of policy-practice integration.

Across these countries, policy directives must be adaptable to local needs and contexts to bridge the disconnect between national frameworks and institutional realities. There is a need to strengthen governance through national digital strategies that balance uniformity with contextual flexibility. This includes dedicated technology leadership at institutional levels to drive coherent implementation.

Cultural Transformation and Faculty Development

The role of faculty in digital transformation cannot be overstated. A generational divide in technology adoption is evident across Nepal, Bhutan, and Sri Lanka, where younger faculty members are generally more proactive in integrating digital tools, while senior educators exhibit hesitance. The COVID-19 pandemic catalysed digital adoption, necessitating rapid shifts to online and hybrid models across all four countries in the case study.

Bhutan and **Sri Lanka** demonstrate notable progress in faculty development, with structured professional development programmes, international training opportunities, and inclusive initiatives for teaching and non-teaching staff. In **India**, attitudes among faculty remain diverse, requiring sustained efforts in change management and technical support.

It is critical to implement structured, continuous training programmes to build faculty capacity for emerging technologies, such as AI and data analytics, while enabling a culture of innovation and adaptability.

Infrastructure and Technology Adoption

Investments in digital infrastructure show marked variation across these nations. **India**'s institutions lead with significant advancements, including dedicated data centres and LMS. At the same time, **Bhutan**'s University Information Management System and increased Internet bandwidth reflect government-led efforts to enhance infrastructure. **Nepal** and **Sri Lanka** face pronounced challenges, such as limited resources, inconsistent departmental adoption, and reliance on basic technologies.

Geographic factors also amplify disparities. For instance, universities in northeast **India** grapple with infrastructural limitations due to remote locations, a challenge mirrored in Bhutan's natural disruptions and in Nepal's uneven resource distribution as well as remoteness and infrastructure-related issues. Despite these hurdles, the focus on cost-effective solutions like open-source platforms in India and Bhutan underscores the potential of strategic resource allocation.

It is prudent to prioritise inclusive and sustainable infrastructure development to ensure equitable access to digital resources, particularly in geographically and economically disadvantaged regions.

Innovation and Emerging Technologies

The integration of advanced technologies such as AI and data analytics remains in its nascent stages across these countries. **India**'s universities in Kerala and Maharashtra illustrate evolving knowledge management practices, while **Sri Lanka**'s use of analytics to monitor student engagement marks a step toward data-driven decision-making. **Bhutan**'s innovation camps and hackathons encourage creativity, but systemic integration of emerging technologies into curricula is limited. **Nepal** faces hurdles in adopting advanced educational technologies, focusing instead on cost-effective, foundational systems.

The need for strategic roadmaps that align with global trends in higher education is evident across all four countries. Establishing centres of excellence for digital innovation to integrate emerging technologies into teaching, learning, and research, supported by inter-institutional knowledge-sharing networks is one way to adopt emerging technologies ethically and responsibly.

Resource Constraints and Sustainability

Heavy reliance on government funding and external donors emerges as a common barrier in Bhutan, Nepal, and Sri Lanka, where financial constraints limit the scope of digital transformation initiatives. **India**'s universities demonstrate greater autonomy in mobilising resources and leveraging public-private partnerships to enhance digital capacity.
The challenge of creating sustainable funding models underscores the need for diversification. Bhutan's dependency on grants highlights the vulnerability of initiatives reliant on external sources, while Nepal's financial limitations curtail investments in robust technologies.

Diversifying funding sources by encouraging partnerships with industry and international institutions could ensure sustainable investments in digital infrastructure and capacity-building.

Report on Digital Transformation
in Higher Education in South Asia

03

High-level Recommendations for Digital Transformation

Short-term Recommendations (0-2 Years)
Medium-term Recommendations (3-5 Years)
Long-term Recommendations (6+ Years)
Special Focus: Faculty Development

High-level Recommendations for Digital Transformation

Consider aligning ICT and education policies to ensure national ICT strategies address education's needs. Strong collaboration between the two ministries will be essential.

Based on the insights gathered from interviews, document analysis, and literature review, the following strategic recommendations are provided to guide digital transformation efforts in South Asia.

Short-term Recommendations (0-2 Years)

- **Implement targeted faculty training programmes** – Develop and roll out digital literacy workshops for faculty, focusing on blended learning techniques, AI-driven teaching tools, and digital pedagogy. Partner with both academic institutions and industry so that faculty can gain deeper insights into the meaningful use of technology for deeper learning as well as for hands-on experimentation.

- **Refine digital governance policies at institutional levels** – Universities can create dedicated IT governance committees responsible for ensuring cybersecurity compliance and streamlining e-learning resources.

- **Strengthen cybersecurity frameworks** – Institutions can adopt standardised cybersecurity guidelines, train IT personnel on data protection laws, and introduce multi-factor authentication systems to secure sensitive student and research data.

- **Expand digital learning access for disadvantaged students** – Governments can distribute subsidised digital devices and low-cost Internet access packages to students from low-income backgrounds, particularly in rural areas.

- **Develop regional knowledge-sharing networks** – Establish online platforms where faculty, researchers, and policymakers across South Asia can collaborate, share best practices, and access OER.

Medium-term Recommendations (3-5 Years)

- **Invest in digital infrastructure development** – Expand high-speed broadband connectivity, cloud computing facilities, and digital libraries. Focus on promoting national digital learning repositories that store interactive learning modules, research papers, and digital textbooks.

- **Improve university-industry Collaboration** – Establish technology incubators within universities where faculty and students can work alongside industry professionals on applied research, EdTech innovation, and ethical AI-driven educational solutions.

- **Reform curricula to incorporate digital competencies** – Embed digital competencies into higher education curricula. Promote the integration of digital literacy, coding, AI, and data analytics into core curricula, ensuring that graduates are equipped with relevant technology skills.

- **Strengthen cross-border academic mobility and research partnerships** – Develop a South Asian Higher Education Digital Alliance, allowing students and faculty to transfer credits seamlessly between institutions, participate in joint online courses, and collaborate on research initiatives.

- **Implement e-learning accreditation and digital certification policies** – National education regulators in the region can implement a common framework for accrediting online programmes, ensuring that digital credentials are recognised across the region.

Long-term Recommendations (6+ Years)

- **Develop sustainable funding models for digital transformation** – HEIs need to explore innovative financing schemes that incentivise them to invest in emerging learning technologies, faculty development, and smart campus ecosystems.

- **Create regional technology-enabled research hubs** – Leading universities in the region should collaborate to develop technology-enabled research centres that focus on understanding the pedagogical impact of education analytics, adaptive learning, intelligent tutoring systems, and other emerging technologies.

- **Implement a unified South Asian digital education policy** – Policymakers should work towards a regional digital education standard, ensuring mutual recognition of online degrees, coordinated research funding, and shared best practices for digital transformation.

- **Enable evidence-based policy making informed by analytics** – Universities should invest in data platforms, aggregating educational analytics to drive evidence-based policymaking. What constitutes meaningful educational analytics should be carefully thought through.

Special Focus: Faculty Development

- **Launch a Digital Teaching Excellence Initiative** – Universities across the region should collaboratively create multi-tiered professional development programmes, offering certifications in digital pedagogy, gamification, and AI for Educators to ensure faculty preparedness.

- **Create structured mentoring programmes** – Pairing digitally proficient faculty members with those needing support can accelerate digital adoption and enhance peer learning.

- **Invest in digital wellness** – Digital teaching should not lead to burnout; therefore, institutions need to offer workload management support and flexible online teaching schedules to promote faculty well-being.

- **Develop regional digital competency frameworks** – A digital competency framework should be developed for the region so that there is a shared understanding of the critical competencies most required for the faculty.

Conclusion

This report examines the digital transformation of higher education in South Asia, guided by the Jisc Framework for Digital Transformation in Higher Education (2023). Through case studies in Bhutan, India, Nepal and Sri Lanka, the analysis evaluates policy frameworks, institutional practices, and regional challenges, highlighting progress, gaps and opportunities.

Across South Asian countries, national policy directions are increasingly geared towards digital integration in higher education. For example, Pakistan's National Education Policy and Digital Pakistan Policy emphasise ICT incorporation despite economic instability, limited resources, and faculty skill gaps. Initiatives like India's SWAYAM and faculty development programmes with short courses, digital device deployment, and other strategies demonstrate progress in flexible learning and digital preparedness. However, uneven policy implementation, infrastructure limitations, and training gaps highlight the need and opportunities for sustained efforts and further innovation.

Nevertheless, critical challenges persist, most notably the digital divide with urban-rural and income disparities in ICT access across the region. To address these inequities, strategies for continuing education such as sustained faculty development, effective ICT policies, and financial support are crucial. Meanwhile, emerging technologies, such as AI and machine learning, are on the agenda for adoption, exemplified by the Digital Pakistan Policy and India’s National Strategy for Artificial Intelligence.

Common barriers, including uneven access to ICT facilities within regions, inadequate digital literacy and financial constraints, point to the need for infrastructure improvements and digital skill development. South Asia's digital transformation in higher education reflects a diverse landscape: while innovative strategies and shared challenges emerge across borders, the success of innovative initiatives hinges on thoughtful policy implementation by various stakeholders in higher education.

The digital transformation journeys of HEIs in Bhutan, India, Nepal, and Sri Lanka illustrate a blend of challenges, progress, and potential as evidenced by the case studies. While India demonstrates leadership in policy implementation and innovation, Bhutan excels in aligning digital goals with national development. Nepal and Sri Lanka highlight the importance of coordinated strategies and inclusive practices to bridge existing gaps.

These nations can build resilient and equitable digital ecosystems by focusing on faculty development, investing in inclusive infrastructure, and ethically and responsibly adopting emerging technologies. A collaborative, context-sensitive approach is essential to ensure that digital transformation remains focused on enhancing the quality of teaching, learning and research in higher education. This includes bridging the digital divide, improving knowledge sharing, and enhancing the experience of creating artefacts. All efforts must align with technology-enabled innovation tailored to the region’s unique needs.

Report on Digital Transformation in Higher Education in South Asia

04

Appendix 1: Literature Review and Document Analysis

Country Details

Bhutan: Trends, Developments, and Challenges
India: Trends, Developments, and Challenges
Nepal: Trends, Developments, and Challenges
The Maldives: Trends, Developments, and Challenges
Pakistan: Trends, Developments, and Challenges
Sri Lanka: Trends, Developments, and Challenges

Appendix 1: Literature Review and Document Analysis

Country Details

Bhutan: Trends, Developments, and Challenges

Bhutan has two public universities: The Royal University of Bhutan (RUB) and The Khesar Gyalpo University of Medical Sciences of Bhutan (KGUMSB). The country also hosts 12 colleges. As of 2019, student enrolment in higher education stood at 12,689, contributing to a Gross Enrolment Ratio (GER) of 15.6%. Bhutan demonstrates a notable Internet penetration rate of 85.6% (Kemp, 2023).

Educational policies in Bhutan significantly emphasise integrating ICT into the nation's educational landscape. This is evident from the strategies to leverage digital advancements to enhance learning, accessibility, and the overall quality of tertiary education.

Tertiary Education Policy of Bhutan 2010

The policy emphasises integrating compatible virtual learning environments in teaching and learning to transform educational processes and enable distance learning. A common system across tertiary education institutions is crucial for providing uniform training, building expertise, and seamlessly sharing educational materials. Online education models support distance learning, promote self-directed learning among students, and enhance information literacy skills. Government-supported systems provide a repository of resources, reducing administrative burdens and offering flexibility in learning time and location. Even within the context of higher education libraries, there is a growing preference for digital storage.

Below are two other policies that stress ICT in tertiary education.

Table 2 Policies that Stress ICT in Tertiary Education in Bhutan

Policy	Aims
Bhutan ICT Policy and Strategies (BIPS) 2004	• Targets include ensuring affordable, fast, secure, and sustainable ICT infrastructure • Focus on leveraging ICT for good governance, encouraging Bhutanese info-culture, and creating a high-tech habitat • Development of a national ICT indicator to measure the information society economically and socially
National Educational Policy 2018	• Support for different study modes and flexible course structures in Tertiary Education Institutes • Promotion of a strong culture of research and continuous professional development • Leveraging ICT for enhanced teaching and learning through infrastructure development • Measures for equitable access considering socio-economic factors, geography, gender, and disability • Emphasis on promoting culture, tradition, and values in tertiary education

Access to information sources, including phones, computers, the Internet, and libraries, is vital for research and intellectual engagement. However, Bhutan faces challenges with access and lacks formal protocols for documenting, sharing, and accessing research outcomes, impacting decision-making and resource efficiency. Efficient dissemination methods, supported by ICT investment and collaboration with neighbouring IT companies, are crucial for educational and economic advancement. The proposed National Centre for Research and Innovation (NCRI) could develop policies with input from technical ICT specialists and librarians to secure access to research data. Information literacy, essential for workforce readiness, higher education, and decision-making, is significantly influenced by ICT. Promoting an open information culture and emphasising skills like scepticism and evidence-based reasoning is essential (Royal Government of Bhutan, 2004).

The Tertiary Education Policy of Bhutan (Ministry of Education, Bhutan, 2010) even recommends specific library standards for tertiary education institutions:

- An online catalogue (OPAC) to ensure easy access to library resources
- Access to important electronic journals and databases
- An automated circulation and security system to facilitate record-keeping and prevent theft
- Networked computers within the library premises to ensure sufficient Internet access
- An inter-library loan system to facilitate resource sharing
- Training of library staff at all levels to ensure efficient service delivery

India: Trends, Developments, and Challenges

As of January 2023, India's educational landscape comprises 1,074 universities distributed across various categories, including 460 state universities, 128 deemed-to-be universities, 56 central universities, and 430 private universities. The number of colleges has reached 43,796 (University Grants Commission, India, 2023). The higher education sector boasts a substantial enrolment of 43 million students, guided by a teaching force of 15.98 lakh[6] educators. The GER stands at 28.4. Gender Parity Index (GPI), the ratio of female GER to male GER is 1.01 (Ministry of Education, India, 2022).

42% of universities, 22% of colleges, and 21% of stand-alone institutions were connected to the National Mission in Education through Information and Communication Technology (NMEICT).

National Education Policy 2020

Appropriate technology integration is envisaged to play a pivotal role in improving classroom processes. The aim is to support teacher professional development, enhance educational access for disadvantaged groups, and streamline educational planning, administration, and management. This strategic approach includes the better integration of technology-based education platforms, such as Digital Infrastructure for Knowledge Sharing (DIKSHA) and SWAYAM, across HEIs (Ministry of Education, India, 2020).

HEIs are expected to actively research disruptive technologies and contribute to creating instructional materials and courses, including online courses in cutting-edge domains. In line with these initiatives, the establishment of the National Educational

[6] A lakh is a unit in the Indian numbering system equal to one hundred thousand (100,000).

Technology Forum (NETF) is proposed to provide a platform for the free exchange of ideas on leveraging technology to enhance learning, assessment, planning, and administration.

To address the challenges posed by the COVID-19 pandemic, a comprehensive set of recommendations has been formulated to promote online education. These measures aim to ensure preparedness with alternative modes of quality education whenever and wherever traditional and in-person modes are not feasible. As part of this endeavour, a dedicated unit will be created within the Ministry of Human Resource Development to oversee the development of digital infrastructure, digital content, and capacity building, catering to the e-education needs of both schools and higher education.

The initiative also emphasises the preparation of professionals who are adept in cutting-edge technologies like AI. The proposal includes establishing a National Research Foundation (NRF) to strengthen research in AI. The overarching goal is to achieve a 50% GER by 2035 – a significant increase from the current rate of around 28%. These concerted efforts aim to shape a technologically advanced and inclusive education landscape for the future.

National Strategy for Artificial Intelligence 2018

The strategy document outlines a comprehensive strategy to enhance and empower human capabilities in addressing prevalent challenges related to access, affordability, shortage, and inconsistency of skilled expertise using AI. It emphasises the effective implementation of AI initiatives to evolve scalable solutions tailored for emerging economies.

The document recommends developing a national strategy to build a vibrant AI ecosystem in India, focusing on developing guidelines for responsible AI and identifying AI applications with maximum social impact. It underscores the potential of AI in improving access to quality education and advocates the promotion of AI-related research initiatives. Through these key strategies, the report seeks to pave the way for a holistic integration of AI technologies to address complex societal challenges.

National Mission on Education through ICT (NMEICT) 2009

The National Mission on Education through ICT (NMEICT) was launched on February 3, 2009, as a centrally sponsored scheme to leverage the potential of ICT in the teaching and learning process. The NMEICT scheme has three major components:

- Content generation
- Providing connectivity to universities and colleges
- Research and development of low-cost access devices

The document discusses how, despite increased enrolment, challenges persist due to low literacy rates. The aim is to address this through ICT-enabled strategies to personalise learning. The surge in digital technology has spurred a demand for innovative content models, underscoring the significance of translating educational materials into regional languages and accommodating diverse learning abilities. The proposed expansion of the SAKSHAT portal reflects a commitment to comprehensive e-learning and support. While opportunities arise from decreasing hardware costs, it is crucial to acknowledge potential threats, including a widening knowledge divide and the intensification of global competition.

The need of the hour is to provide digital literacy to the teaching-learning community in Higher Education. The availability of Education Satellite expanding connectivity, and the vast wealth of knowledge available on the Internet present opportunities for knowledge expansion.

Below are some of India's other key digital initiatives that can potentially transform the higher education landscape.

Table 3 Key Digital Initiatives in India

Digital Initiatives	Aims and Activities
National Mission on Education through Information and Communication Technology (NMEICT) 2009	• Leverage the potential of ICT for all learners in higher education • Bridge the digital divide • Provide connectivity and access devices • Offer high-quality e-content • Focus on pedagogical advancements for e-learning. • Train and empower teachers to effectively use the new method of teaching-learning • The scheme encompasses three major components: content generation, connectivity to universities and colleges, and research and development of low-cost access devices
National Digital Education Architecture (NDEAR) **(A key enabler to National Education Policy 2020)**	• An architectural approach to create a uniform digital infrastructure across the educational ecosystem • Aims to bridge the digital divide, enhance collaboration, and provide a personalised learning experience • Adopts a "unifying, not uniform" principle, allowing flexibility, customisation, and interoperability • Encourages collaboration, knowledge sharing, and the use of OER
SWAYAM (The Study Webs of Active Learning for Young Aspiring Minds)	• The platform provides access to cost-effective online courses for learners from 9th grade to postgraduation • Integrates direct teaching, e-content, and student query resolution through discussion forums and self-assessment via quizzes
SWAYAM Prabha	• Extends the reach of educational content through 32 high-quality educational channels provided via Direct to Home (DTH) • Focuses on making quality learning resources accessible to areas with limited Internet connectivity, ensuring 24X7 educational broadcast

[7] SAKSHAT is a one-stop education portal launched on October 30 in India.
See more at: https://www.education.gov.in/technology-enabled-learning-1

Digital Initiatives	Aims and Activities
National Digital Library	• A virtual repository with more than 3 crore[8] digital resources, catering to over 50 lakh registered students, with an easy-to-use mobile app
E-VIDWAN	• Provides information about subject experts to facilitate collaboration and communication
National Academic Depository	• Stores academic awards and ensures easy access, authenticity validation, and effective storage
Free and Open-Source Software for Education (FOSSEE)	• Promotes the use of open-source software in educational institutions • Offers instructional material, documentation, and awareness programmes
Virtual Lab	• Facilitates interactive labs with simulated environments for experiments and knowledge evaluation
Shodhganga and Shodhgangotri	• Open-access repositories for Indian theses and dissertations, avoiding duplication of research
E-Shodhsindhu	• Provides access to over 15,000 international electronic journals and e-books for higher educational institutions
Digital University	• Aims to provide world-class universal education in different Indian languages and ICT formats • Leverages a networked hub-spoke model
National Programme on Technology Enhanced Learning (NPTEL) 2003	• Involves seven IITs and IISc, offering online courses in engineering, basic sciences, and humanities • All courses are free to enrol and learn from. The certification exam is optional and comes at an affordable fee per course exam
Open-Source Courseware Animations Repository (OSCAR)	• Focuses on providing audio-visual learning material and projects in STEM subjects • Promotes accessible, quality learning experiences

[8] Crore denotes the quantity ten million and is equal to 100 lakh in the Indian numbering system.

Gaps between Policy and Practice

As we examine the landscape of innovative technologies like AI and the overall research ecosystem in India, it becomes apparent that several critical gaps affect its true potential. These include but are not limited to the following:

- Lack of collaborative/interdisciplinary approach
- Limitations in experimental validation at scale
- Inadequate facilities to support large-scale experimental test beds
- Challenges in connecting with stakeholders and practitioners to convert outputs to outcomes
- Deficiency in large-scale mission mode project management capabilities

National Strategy for Artificial Intelligence 2018

A unified and transformative initiative is critical to establishing a robust and research-centric AI strategy for India. Even when it comes to implementing cost-effective e-learning solutions, significant challenges persist:

- Limited access and infrastructure at the institutional level
- Non-standardised testing and issues with quality of teaching
- A weak legal framework for the qualification and certification of those who create and deliver content
- The widening digital divide

Institutions need to proactively address these challenges by adopting a comprehensive approach. This could involve supporting technological advancements, building robust networks, offering digital literacy training for teachers, and encouraging collaboration and research initiatives.

Nepal: Trends, Developments, and Challenges

In Nepal, there are a total of 12 public universities. The higher education landscape further includes 1,400 colleges catering to a student population of 460,000 during 2021-2022. The GER in higher education stands at 13.3%, with 18.76% representing male students and 15.64% female students, based on data from 2019. Nepal hosts the Nepal Open University, an institution offering open education. The country exhibits a growing digital presence, reflected in its Internet penetration rate of 51.3% as of 2023.

The national-level policies addressing ICT integration in Nepal emphasises inclusivity and aim to broaden access, enhance quality, and introduce innovative strategies. The policies mark a significant commitment to leveraging technology to advance education.

The Open and Distance Learning Policy 2063

The policy puts forward a vision aimed at broadening educational access and inclusivity. The main objective is to extend comprehensive access to school and higher education, addressing the diverse and special needs of out-of-school children, marginalised groups, homemakers and those employed. The policy envisions enhancing the quality of conventional education by strategically deploying ICT to provide diverse support mechanisms and materials.

The ODL Policy 2063 also underscores the importance of encouraging lifelong learning, continuing education, and professional development through an open and distance learning system. This objective is achieved through a mixed-mode delivery mechanism to ensure flexibility and adaptability to evolving educational needs. Another significant facet of the policy is the inclusion of skill-based education. It points to offering customised courses tailored to meet the specific requirements of the labour force

seeking employment in national and international job markets.

It aims to preserve and recognise the traditional skills and customary learning of tribal and indigenous communities by creating avenues for skill certification and accreditation, encouraging cultural preservation and promoting inclusivity within the educational framework.

The Digital Nepal Framework 2019

The Digital Nepal Framework advocates the mandatory inclusion of IT education in the curricula of schools and colleges, in addition to incorporating Geographic Information System education. A key directive is the systematic enhancement of the capacity to deliver advanced ICT education, emphasising its critical role in ensuring technological literacy.

The framework proposes ICT literacy programmes and technology-enabled teacher training programmes to combat digital exclusion in rural communities and among the underprivileged. Urban schools and university campuses are encouraged to deploy high-density networks to ensure seamless functionality of devices, IT tools, and applications. The utilisation of Massive Open Online Courses (MOOC) is highlighted as a cost-effective measure to bridge disparities in course quality and training.

It also recommends the adoption of gamification, augmented reality/virtual reality (AR/VR) technologies, and badges to enhance classroom engagement in school education. The framework also recommends adopting online testing tools to assess student capabilities and personalise course recommendations.

The framework also encourages deploying high-density networks to improve connectivity and promoting MOOC to facilitate distance learning and expand educational opportunities.

The ICT in Education Master Plan (2013)

The ICT in Education Master Plan, drafted with technical support from UNESCO, addresses technological integration in education. It aims to bridge digital gaps by ensuring student access to ICT and emphasising technology's role in teaching and learning through diverse media platforms.

Standards for Higher Education Digitalisation

Nepal's Nurturing Excellence in Higher Education Program (NEHEP) concentrates on three key areas:

- Improving policy and governance for digitalisation and connectivity
- Strengthening campus networks and enhancing distance learning capabilities
- Digitising the University Grants Commission and university administration

The University Grants Commission has set standards for digitalisation in higher education, emphasising integrating online learning with traditional face-to-face education (University Grants Commission, Nepal, 2022).

Aligned with Nepal's National Education Policy, NEHEP responds to the growing significance of ICT in delivering quality education. NEHEP seeks to overcome digitalisation challenges, including limited connectivity and skilled human resources. To enhance digital skills in HEIs, the programme offers training in digital literacy, pedagogical tools, and assessment tools.

Gaps Between Policy and Practice

Nepal faces limited evaluation and research of ICT in education due to a focus on infrastructure, inadequate funding, weak connectivity, and

insufficient engagement from leadership. To address these gaps, the Nepalese master plan emphasises content development, training, and capacity building, while the national budget prioritises ICT hardware. Effective coordination, curriculum revision, just-in-time teacher professional development, improved teacher support, and evaluation through Education Management Information System data are crucial for ensuring sustainable and cost-effective ICT use in education (Lim et al., 2020). Furthermore, the establishment of Nepal Open University marks a milestone in digital transformation of higher education.

Challenges in digitalisation in higher education in Nepal include the need for regular improvements and updates in policy and practice, the need to complement face-to-face education with digital learning, and issues with policy and practice dimensions. These gaps are being addressed by identifying standards for digitalisation, developing operational policies and guidelines for monitoring progress, and receiving support from the University Grants Commission in funding, technical support, and coordination (University Grants Commission, Nepal, 2022).

The Maldives: Trends, Developments, and Challenges

The Maldives has two publicly funded universities and ten colleges, consisting of one public institution and nine private establishments. The GER for women is much higher than the GER for men. In 2019, female GER was 66.5%, while male GER was 17.7%. The nation demonstrates robust Internet penetration, reaching 85.8% in 2023 (Mehata & Dhadwal, 2023).

The Maldives' education policies strongly emphasise ICT in higher education. The National Education Policy, the Maldives Plan for Higher Education, and comprehensive ICT in Education Master Plans demonstrate the nation's commitment to enabling digital literacy, innovation and connectivity within its educational landscape.

National Education Policy 2020

The policy underscores the development of e-learning platforms and digital resources, with the aim to provide centralised access to educational materials. It emphasises providing necessary digital infrastructure and devices, integrating digital literacy into higher education, offering professional development for educators, exploring online assessment methods, promoting research in educational technology, encouraging collaborations between institutions and industry partners, utilising data analytics, and implementing robust cybersecurity measures.

The Maldives Plan for Higher Education (2017-2022)

The plan acts as a strategic blueprint for the next five years. It addresses challenges through policies in five main areas: size and structure, governance, quality, economic and social relevance, and budget and financing. Strategies include spreading public sector higher education delivery, supporting private sector expansion, enhancing open and distance learning, clarifying roles and responsibilities, strengthening governance, improving quality assurance mechanisms, increasing enrolment in diverse disciplines, supporting research for socio-economic development, developing online programmes, and implementing flexible financial assistance for students.

The ICT in Education Master Plan (ICTE-MP1) 2015-2018

This master plan discusses ICT literacy training for all teachers, upgrading Teacher Resource Centres, updating school curriculum and assessment methods, accrediting distance education courses, and organising an annual ICT in education conference. The subsequent plan, ICTE-MP2 (2021-24), focuses on digital competence and leadership, digital educational resources, infrastructure and connectivity, and educational data management and system development.

Pakistan: Trends, Developments, and Challenges

There are 202 universities and degree institutions for higher education in Pakistan. Among them, 60% (122) are public universities, and 40% (80) are private universities. In the country's higher education landscape, 1.858 million students are enrolled in universities and degree institutions. The majority (around 1.535 million students), comprising 83%, pursue their studies in public universities, while the private sector accommodates 17%, with an enrolment of 0.323 million students. The enrolment distribution reveals that 55% (1.026 million) of the students are male, and 45% (0.832 million) are female.

The educational landscape involves 60,279 teachers, 65% employed in the public sector institutions (38,880 teachers) and the remaining 35% in the private sector (21,399 teachers). This data demonstrates that only 4% of the overall student population in the nation has access to university education (Pakistan Institute of Education, 2022).

National Education Policy of Pakistan

The National Education Policy of Pakistan (2017–2025) emphasises the importance of integrating ICT in education. It aims to provide access to ICT, improve teaching quality through technology, and develop complementary approaches. The policy focuses on leveraging existing ICT programmes, enhancing education department capacity, and revising the curriculum and teacher training to be learner-centred and IT enabled (Asian Development Bank, 2023).

Digital Pakistan Policy-2018

In 2018, the Ministry of IT and Telecom, Pakistan, published the Digital Pakistan Policy document outlining key recommendations to bolster ICT education opportunities in collaboration with the Ministry of Federal Education and Professional Training. The policy aimed to create inclusive and high-quality ICT education accessible to all, emphasising the need to bridge the gap between industry and academia for the relevance of ICT in education.

It proposed several action points, including expanding network accessibility in educational institutions, promoting the integration of coding and cloud computing across all education levels, updating higher education IT programmes to align with international standards, and encouraging the development of e-portals for academic and research materials nationwide.

It also proposed establishing an internship program focusing on cutting-edge technologies such as IT, AI, robotics, fintech, cyber security, big data, and entrepreneurship. This initiative aimed to prepare young IT graduates for industry demands, ensuring they are market-ready and enhancing their employability, according to the Ministry of Information Technology and Telecom (2018).

Pakistan Research Repository

The Pakistan Research Repository, started by the Higher Education Commission, aims to showcase worldwide research from Pakistan's universities. It's like a digital library storing all the PhD and MPhil theses created in Pakistan. The service provides free access to these research papers, helping share the knowledge from Pakistan's institutions with the world (Pakistan Research Repository, 2024).

Gaps Between Policy and Practice

The article, *"Higher Education Policy in Pakistan, Challenges and Opportunities in Global Context"*, published in the journal *'Research'* in 2023, highlights challenges in Pakistan's higher education sector continues to navigate challenges related to economic constraints and resource limitations.

A shortage of trained academics and expensive education further hampers quality education and enrolment (Zia et al., 2023). Additionally, the lack of quality institutions and outdated curricula for higher education could worsen these issues. Despite these challenges, opportunities exist in some universities with diverse academic streams, a growing focus on research and innovation, strategic positioning in South Asia, and initiatives like scholarships and global collaborations. These opportunities can pave the way for a more robust and globally competitive

higher education landscape (Zia et al., 2023).

The study, *"Role of ICT in Shaping the Future of Pakistani Higher Education System"*, revealed that while major cities in Pakistan widely use ICT in HEIs, the overall country-wide usage is only 50%, which is significantly below the suggested benchmark of 75%.

Key obstacles identified in the study include technological infrastructure limitations, funding constraints, staff skill development gaps, and language-based content challenges. The research attributes delayed ICT integration to teachers' insufficient technological competencies, financial restrictions, resistance to change, and preference for lecture hall facilities over computer labs. To address these issues, the study recommends adopting effective ICT policies, ensuring technological resource access, curriculum modifications balancing theory and practice, piloting ICT-based education models, developing sustainable financial strategies, and fostering coordination among national ICT groups (Shaikh & Khoja, 2011).

The qualitative study on digitalisation in Pakistani higher education libraries revealed key insights. Libraries preferred in-house digitalisation, and a collaborative strategy was deemed essential for long-term success. Funding strategies included initial internal institutional support, with potential for external funding after project completion. While a centralised open-access repository was preferred, a hybrid model was recommended depending on collection characteristics, ensuring flexibility in digital transformation efforts (Rafiq & Ameen, 2014).

Digital Divide

The *"Digital Divide Among Higher Education Faculty"* study revealed a lack of universal ICT access among faculty members. The faculty in Pakistan mostly used technology for general tasks in their daily lives, not so much for teaching activities like planning lessons, sharing learning materials, encouraging collaboration among students, or assessing their performance.

It revealed significant digital disparities across Pakistani universities. Faculty differences were evident based on age, gender, and university sector. Public sector educators had less ICT access compared to private universities. Younger faculty demonstrated excellent technological proficiency and usage, while female teachers showed fewer digital technology opportunities than male counterparts. Workplace ICT infrastructure significantly influenced technology adoption, with better-equipped institutions encouraging more digital integration in professional practices (Soomro et al., 2020).

The chapter published in 2021 in the book *"Global Trends, Dynamics, and Imperatives for Strategic Development in Business Education in an Age of Disruption", "The Digitalization of Pakistan's Universities? An Opportunity to Refocus and Repurpose Towards Hybrid Learning"*, mentions the digital skills gap, division in education sectors, digital divide, power and energy shortages, lack of ICT facilities, and financial constraints as the challenges towards the digitalisation of Pakistan's Universities.

During COVID-19, the digital divide in Pakistan's education system became clear, with urban areas having better access to technology than rural ones. Power outages and limited Internet access disrupted online learning, especially in rural regions. A lack of ICT facilities, service centres, and funding for digital tools made things worse. Many students had to rely on pirated software due to high costs. Creating quality online teaching content was also difficult for institutions with limited resources. These challenges highlight the urgent need to improve digital skills, infrastructure, and financial support in higher education (Malik, et al., 2021).

Sri Lanka: Trends, Developments, and Challenges

Sri Lanka has 17 public universities and 1400 colleges catering to various academic disciplines. The GER in Higher Education was 21.61% (UNESCO, 2022). The Open University of Sri Lanka is a pioneer in open education within the country. Regarding digital connectivity, Sri Lanka has an Internet penetration rate of 66.7% as of 2023 (Kemp, 2023).

National Education Policy Framework (2020-2030)

In 2015, the Sri Lanka Qualifications Framework

identified twelve categories of learning outcomes, extending from senior secondary education to the doctoral level. These include subject/theoretical knowledge, practical knowledge and application, communication, teamwork and leadership, creativity and problem-solving, managerial and entrepreneurship, information usage and management, networking and social skills, adaptability and flexibility, attitudes, values and professionalism, the vision of life, and updating self/lifelong learning.

The policy recommends equipping all educational institutions with ICT facilities administered by competent personnel to ensure uniformity. Providing ICT infrastructure, applications, Internet connectivity, and technical support services is critical for successfully implementing and promoting a blended teaching-learning approach in HEIs.

Presidential Task Force on Sri Lanka's Education Affairs (2020)

The "Re-imagining Education in Sri Lanka" report, presented by the Presidential Task Force on Sri Lanka's Education Affairs, highlights five crucial dimensions:

- ICT curriculum
- ICT Infrastructure
- Capacity development
- Organisational change and leadership
- The National ICT education policy and implementation strategies

The Ministry of Education underscores five pillars for systematic ICT implementation: Digital Infrastructure, Connectivity, Content, Capacity Building, and Innovation.

The report identifies gaps in capacity building and training, emphasising the lack of long-term plans for ICT skills integration, insufficient training for ICT subject teachers, and the absence of a comprehensive e-learning capacity development program. Establishing LMS is advocated as a compulsory facet of university infrastructure, addressing challenges like inadequate IT infrastructure. The report also emphasises the importance of differentiating instructional design for online courses and face-to-face instruction.

Recognition and support for innovative teaching practices that integrate IT are recommended. The report also emphasises infrastructure development for blended/online learning, provision of personal computing devices for students, and support for collaborative tools.

The report focuses on the need for students to utilise their personal computing devices, like laptops, tablets, or smartphones, for online learning from home. It suggests that every student entering HEIs should be assisted in obtaining a laptop and a smart mobile device tailored to their preferences and needs. However, students come from varying financial situations, and therefore, the report underscores the importance of enabling an educational loan to support them in this process. It also proposes the use of special Broadband Access packages to reduce the cost of data access. The report urges the inclusion of e-learning guidelines in the Sri Lanka Qualification Framework (Presidential Task Force on Sri Lanka, 2022).

Support Systems

Lanka Education and Research Network (LEARN) currently supports all universities by providing high-speed Internet connection. LEARN Technical Assistance Centre offers remote engineering support to member institutes, aiding those unable to implement services independently. Public Eduroam by LEARN boasts 100+ high-speed academic and research network hotspots across Sri Lanka. This initiative promotes global Wi-Fi roaming for the Sri Lankan R&E community, allowing free connectivity to learn from any Eduroam hotspot nationwide. LEARN eduID provides students and staff with a lifelong learning, research, and collaboration identity. This simplifies access to various global services, as eduID requires only one username and password (Lanka Education And Research Network, 2024).

Gaps Between Policy and Practice

A survey conducted by LEARN in 2019 indicates that Moodle is widely adopted as the primary LMS,

alongside common ICT tools like the G-suite, for technology-enabled teaching-learning. However, utilising these resources, especially pre-COVID, has been less than encouraging. The survey reveals disparities in the availability of ICT infrastructure, technologies, and technical know-how across universities and HEIs. While LMS are present in almost all institutions, insufficient server capacities and limited e-library facilities underscore the need for substantial upgrades.

Only around 50% of universities/HEIs have e-library facilities, with limited Wi-Fi coverage. The extent of online platform use varies among universities, faculties, programmes, and subjects. The survey reveals varied adoption of LMS, with approximately 34% of HEIs having 80% or more courses online, 40% having 40-60% online courses, and 20% having less than 40% online courses. Challenges faced by teachers include limited ICT infrastructure. However, many teachers have embraced online teaching methods.

Nearly 50% of students lack devices for accessing online platforms, with smartphones being more prevalent. Issues such as connectivity problems, data limitations, and environmental factors further come in the way of effective teaching-learning and assessments online. Online assessment applications by the academic community remain extremely low, with shared challenges in Internet disruptions, network congestion, and inadequate technical support.

Report on Digital Transformation
in Higher Education in South Asia

05

Appendix 2: Country Case Studies

Bhutan – A Case Stud
India – A Case Study
Nepal – A Case Study
Sri Lanka – A Case Study
Delimitations of the Research Study

Appendix 2: Country Case Studies

Research Methodology

The research study used a multimodal qualitative case study approach. It is a qualitative approach that explores one or multiple real-life cases over time. This method involves detailed, in-depth data collection from multiple sources, resulting in a comprehensive case description or identification of case themes (Creswell & Poth, 2017). In a Multimodal approach, a study that uses interviews and written documents employs multiple methods and data types, enhancing the depth of understanding of participants' experiences. Case studies prove to be highly valuable when exploring inquiries related to the processes (How) and reasons (Why) behind a particular phenomenon, particularly within the context of real-life situations (Yin, 2009). Case studies can identify cause and effect. They are helpful, especially because they observe effects in real-life situations, showing that context significantly influences causes and effects (Cohen et al., 2007). They are particularly suitable for exploratory studies. One of the unique benefits of qualitative case studies is their ability to gather data from multiple sources like interviews, documents, artefacts, and observations (Simons, 2009).

The study aims to explore the digitalisation of higher education in South Asian countries, specifically public universities. South Asian countries have experienced significant digital transformations in their education sectors, particularly impacting higher education.

Jisc's Framework for Digital Transformation in Higher Education was applied to understand the intricacies and scale of challenges in implementing digital strategies and knowing the responsibility of stakeholders in HEIs. The framework has six elements, and each element has four key activity areas, which will lead to exploring the digital transformation of the selected countries as cases. This framework will be reflected in the tools to gather the key activity areas' reflection within the country.

Document Analysis

Document analysis is an analytical method used in qualitative research to gain meaning and understanding from various documents, like policy papers, agendas, reports, and books. It's often combined with other qualitative methods to study the same phenomenon, reducing biases and avoiding reliance on a single source. This approach benefits case studies focusing on a specific phenomenon, programme, or organisation. Document analysis also supports methodological and data triangulation, enhancing the reliability of research findings. By examining documents closely, researchers can uncover rich insights and develop practical knowledge about the research. Preparing other investigation tools, such as interviews and document analysis, helps formulate particular questions and get relevant information. Data matching from interviews and document analysis will be utilised to gain findings for the case study (Yin, 2009).

Research Population & Sample

Population: South Asia

Sample: Four countries, Bhutan, India, Nepal and Sri Lanka, were selected for the case study to explore the notable trends and developments in digital technology that have influenced and transformed higher education in South Asia over the last decade.

Participants: Department heads, faculty in charge, or senior faculty members responsible for the digital technology system at identified public universities in Bhutan, India, Nepal and Sri Lanka were invited to participate.

Selection of participants: The selections were convenient yet purposive, based on a systematic review of the region and the relevance of the potential participants in the study. The participants were selected from the selected South Asian countries based on convenience. The public universities were selected based on systematic reviews of the regional categories of the country, as well as their impact and potential addition to the research phenomenon. The individual participants

selected from the chosen public universities are in charge, head of the department, or senior faculty working on the digitalisation process of education or involved in the digital technology system at the university. The twelve participants were interviewed from selected countries, and interviews were conducted from March 2024 to October 2024.

Research Design

The data collection process included semi-structured interviews with the head of the department, in-charge, or senior faculty members of the digital technology system at the public university and document analysis provided by them.

Semi-structured interview: The semi-structured interview allowed the researcher to add probing questions that arose during the interview along with closed and open-ended questions. Its conversational flow strengthens the dialogue between the interviewee and interviewer. Semi-structured interviews use prepared questions with flexibility for deeper exploration, yielding detailed insights. This method attempts to balance structure and adaptability, making it effective for understanding complex issues. After conducting the semi-structured interview with the interviewee's consent, the researcher demanded some potential documents related to the phenomenon to be studied for analysis (Creswell & Poth, 2017). The semi-structured interviews provided detailed personal accounts, while written documents offered contextual and historical background, providing a fuller picture of the subject matter (Yin, 2009).

Document analysis: Thematic analysis was applied to analyse the data through the emerging themes, using Braun and Clarke's approach (Braun & Clarke, 2012).

The case studies are drawn from interviews conducted with two respondents from Bhutan, one faculty member from the university and a government official; three universities in India, involving six respondents from the northeastern, western, and southern regions. Two respondents were from two universities in Nepal, and two were from two universities in Sri Lanka. Policy documents provided and suggested by respondents were reviewed.

Bhutan – A Case Study

Bhutan has two universities: The Royal University of Bhutan (RUB), which is a decentralised university system comprising 10 colleges and institutes; and Khesar Gyalpo University of Medical Sciences of Bhutan (KGUMSB). RUB was established in June 2003, marking the beginning of the country's independent tertiary education system, which the Indian higher education system had previously regulated (Royal Government of Bhutan, 2024). Until 2008, Delhi University, India, managed key aspects like curriculum design, assessment, and degree awards before RUB took over. Later, the Royal Government of Bhutan enacted the University of Medical Sciences Act of Bhutan (UMSB) in 2012 and the medical university was officially established in 2013 (Royal University of Bhutan, 2022). In addition, the Jigme Singye Wangchuck School of Law (JSW), an autonomous institution offering law degrees, was established in 2015.

Digitisation Policy for Higher Education

The Tertiary Education Board (TEB) was created as the main decision-making body to guide policy for tertiary education. At the same time, the Bhutan Accreditation Council (BAC) was set up to focus on quality improvement. The Registrar for Tertiary Education coordinates and liaises with stakeholders. The Department of Adult and Higher Education (DAHE) acts as the Secretariat for these bodies and has played a key role in developing guidelines, regulations, and mechanisms to support the Tertiary Education Policy of 2010 (Tertiary Education Board, 2010).

The 13th Five-Year Plan (FYP) is projected to employ around 70,000 young people through various sector development in the country. To equip at least 50% of them with higher education or vocational skills by the year 2029, transforming technical education institutions and the Technical and Vocational Education and Training (TVET) system is essential for the country. The plan aims to provide equal access to high-quality education, ensuring graduates are prepared for the modern economy. Key focus areas include upgrading infrastructure, integrating digital technology, enhancing teacher skills, and aligning the curriculum with international standards.

Progress will be tracked through enrolment rates, STEM-related performance of students, and reducing education gaps between rural and urban areas (Royal Government of Bhutan,2018).

Under Bhutan's Ministry of Education, the Department of Adult and Higher Education offers services in tertiary education, non-formal education, and continuing education programmes. It aims to empower citizens by ensuring access to relevant education opportunities. It is structurally guided by the TEB, BAC, Scholarships and Student Support, the Non-Formal and Continuing Education Division Board, and other sub-committees to fulfil its mandates (Ministry of Bhutan, 2024). The details in the following sections are gathered from two respondents from one of Bhutan's public universities.

Section 1: Organisational Digital Culture

Leadership and Strategy

According to one of the respondents, the Bhutanese government strongly supports digital technology in higher education, driven by political will and commitment. Support is primarily through grants and direct contributions, with a recent promise by the government to cut Internet costs by 50% for citizens. This reduction will help increase bandwidth across colleges, aligning with budget projections (Dema, 2024). The government has established a dedicated agency to address cybersecurity issues, ensuring that digital advancements are supported and secure.

The education system's policy framework, especially after the pandemic, has seen significant efforts to incorporate digital learning. One of the respondents said no specific national policy is dedicated solely to pandemic learning practices. Universities have developed internal ICT policies and roadmaps, including a five-year plan aligned with the 13th Five-Year Plan, which focuses on maximising digital technology in higher education.

A substantial budget has been allocated for this transformation, particularly in digital infrastructure, STEM, and AI. While there is no overarching policy, universities have bylaws and proposals for blended learning platforms, some of which have been approved by the government and are nearly achieving legal status, said a respondent.

Collaboration with international institutions, such as the University of Melbourne, is helping Bhutanese universities enhance their policies to create a more comprehensive framework. The 13th FYP, the central guiding document, has allocated significant funds, reinforcing the government's commitment to integrating technology into education.

Institutional Decision-making and Leadership

Decision-making in Bhutanese universities, particularly in the context of technology and digitalisation, involves a multi-layered process with several key steps and challenges.

Decisions about technology, including procurement and faculty capacity building, are guided by internal policies and strategic plans; the faculty further explained that the universities prepare a five-year plan, such as the 13th Five-Year Plan, developed with input from various stakeholders and submitted to the government for approval. Once the budget is secured, execution of the plan is the responsibility of the universities and colleges, with annual assessments to ensure progress.

The college management and research committees review changes or new policies and then present them to the vice chancellor’s office. After amendments, policies are discussed at the academic board meeting and require final approval from the university council, chaired by the prime minister.

Moreover, the faculty mentioned that recent policy changes have focused heavily on STEM fields and digital technologies, leading to the discontinuation of arts and humanities programmes, reflected in the document *Tertiary Education Roadmap for Bhutan: 2017-2027 (Tertiary Education Board, 2017).*

This shift reflects the government's emphasis on digital transformation and poses challenges for integrating these changes into existing educational frameworks.

The university relies on its own internal ICT policies and a five-year plan, which aligns with the broader 13th Five-Year Plan but lacks a clear, national digital learning policy; faculty said in an interview that proposals for blended learning are still waiting for government approval, causing delays.

People and Culture

An interviewee said that colleges in Bhutan actively encourage innovation through regular events. Each semester, three colleges organise innovation camps, hackathons, and marathons involving final-year students and participants from various departments and programmes. These events aim to stimulate creativity and problem-solving skills across the institution.

Several critical aspects emerge when analysing Bhutan's digital transformation, particularly in the context of faculty development. As said by a faculty member, the university's initiative to provide new faculty members with a stipend to purchase laptops signifies a commitment to equipping educators with essential tools for digital engagement. He explained that the investment equips faculty with an option to replace or retain laptops, ensuring sustainability. Moreover, the university's efforts to conduct online seminars, conferences, and short training sessions on emerging technologies underscore its proactive stance on continuous professional development. It demonstrates a structured approach to keeping educators updated with the latest digital advancements by encouraging them to attend various conferences (Gyalpozhing College of Information Technology, 2024a).

The respondent noted that professional development includes both teaching and non-teaching staff, ensuring everyone gains digital skills, supported by annual government grants. The university acknowledges embracing digital transformation is no longer optional but necessary. There is a strong emphasis on shifting mindsets to embrace digital changes. While the university recognises the utility of technology, it encourages faculty to use technology, with younger members being especially adaptable and proactive in integrating it into teaching.

Digital Culture within Institutions

The University has implemented a robust system for tracking and assessing the performance of students and faculty in digital and technology-related programmes. They maintain detailed logs of logins, uploads, downloads, and other system activities. At the end of each year, an assessment team reviews these activities and evaluates performance based on the mandatory measurement system and the faculty's innovative contributions. The university monitors assignments, learning materials, quizzes, and assessments conducted through online systems managed by lecturers. The initiative to send faculty abroad, primarily to India, for training in emerging technologies and to invite international faculty to Bhutan reflects the university's commitment to global exposure and skill enhancement.

The university tracks the progress of IT, engineering, and digital technology graduates after they leave. This tracking helps determine whether their education supports their career achievements and startup projects, ensuring the programmes are effective and successful (Sharma, 2024).

Section 2: Knowledge Creation and Innovation

At the University, certain departments seem to maintain relatively higher engagement with digital technology and innovative teaching practices. However, no single department significantly stands out in using digital teaching and learning tools. Colleges offering computer science courses manage their digital initiatives independently, without a central agency overseeing them. The Gyalpozhing College of Information Technology focuses on new technologies, which is also reflected on the college website (Gyalpozhing College of Information Technology, 2024b). It offers three courses related to emerging fields like blockchain, generative AI, computing, and quantum computing. The college has also made it mandatory for faculty members to use an online platform for teaching assessments, reflecting their commitment to integrating digital tools into their teaching practices.

One respondent said that while students attend classes on campus, assessments are entirely online. The university enables innovation through semesterly camps, including hackathons, marathons, and competitions. Two colleges are revising assessment methods and are expected to present their recommendations at an academic board meeting.

The university has also established a Department of Academics and Research, which promotes research and professional development (Royal University of Bhutan, 2014).

Online Courses and Distance Education

Integrating technology into curricula and distance education is an evolving process in Bhutan. As universities and colleges update curricula to align with modern developments, technological platforms are increasingly central to these changes (College of Science and Technology, Bhutan, 2024). This includes introducing new courses and redeveloping existing ones to incorporate digital aspects, reflecting a commitment supported by high-level authorities, as stated by a respondent.

One of the respondents explained that many college faculty have embraced online platforms such as Coursera, and the government has supported this transition by providing funding and business licenses for tools like Google Workspace. While significant engagement exists with online resources, fully online distance courses are not yet widely available. Instead, hybrid courses that combine online and in-person elements are being implemented.

For distance education, some institutions offer education administration and social sciences programmes. These programmes, however, rely on print materials and require students to attend in-person sessions during winter vacations, integrating technology into traditional learning methods.

Technology and Data/Knowledge Management

Both responses reflect a nuanced view of AI use in academia. They acknowledge that generative AI can be a time-saver for students, providing easy access to the latest information and reducing the need for physical resources like libraries. However, there are concerns that this convenience may negatively impact students' reading habits and research skills. Universities are exploring how to adapt assessments in the AI era, particularly when it comes to assignments. They emphasise the need for students to be honest about their AI usage while also considering how to create meaningful assignments that incorporate AI tools effectively.

Faculty members face challenges in assessing student work due to the sophisticated ways students might use AI, making it difficult to determine the originality of submissions. One respondent said that although no formal policies have been established, discussions and collaborations are ongoing, particularly within specific colleges, to explore how to adapt assignments and assessments to address these challenges. The university understands that it cannot ignore these technologies and may need to embrace them in the future, and they are providing training regarding new technologies (Minis, 2024).

Data Handling and Cybersecurity

One of the respondents said that the university takes a proactive and structured approach to data handling and cybersecurity. The Royal Audit Authority's 2023 report highlights a rise in cybersecurity incidents in Bhutan, with 611 cases during the 12th Five-Year Plan, including phishing and data breaches. Weak data privacy laws and the absence of a national cybersecurity strategy are significant concerns. Since 2016, BtCIRT has handled 1184 incidents, mainly from system vulnerabilities. A robust strategy is crucial, especially with Bhutan's National Digital Identity system launch (Royal Government of Bhutan, 2024).

A dedicated government agency oversees cybersecurity, ensuring robust protection for digital infrastructure. It meticulously logs all user activities, including logins, uploads, and downloads, and uses this data for performance assessments and ratings. Access to this data for external researchers is possible but requires approval from the vice chancellor and college presidents.

Section 3: Knowledge Development

Teaching, Learning, and Research

One interviewee responded that technology adoption in the university's curriculum involves fully integrating

digital platforms into all aspects of teaching and learning. The university is redeveloping its curricula with a strong emphasis on technological platforms, including using Moodle to manage online learning materials, assessments, and administrative tasks. Another member said that the university curricula are publicly accessible for evaluation. However, each college has fair autonomy in offering and assessing its curricula. The university hopes that curriculum redevelopment and technological integration will be strongly supported by the relevant authorities.

Research activities at Bhutan's universities are supported by a robust framework that emphasizes education and research, driven by dedicated networks and institutional mandates. The Bhutan Research and Education Network, established by the government, serves as a crucial backbone for research and educational activities across all colleges in the country. This network facilitates academic collaboration and ensures that the technological infrastructure is in place to support advanced research endeavours.

Section 4: Knowledge Management and Use

Annual reports are generated to analyse performance, identify areas for improvement, and address trends. Student feedback is systematically collected through a questionnaire filled out by all students across the 11 colleges. This feedback is analysed to inform potential policy, curriculum, and administrative changes. Data accessibility is managed under the Vice Chancellor’s office, with readily available internal data. For external researchers, accessing data requires approval from the Vice Chancellor and college presidents, involving a simple application process.

Section 5: Knowledge Exchange and Partnership

Bhutanese universities collaborate with global institutions through MOUs, including exchange programmes with universities in India, Japan, the UK, and more. The respondent faculty said that Bhutanese institutions work with international universities like the University of Canberra and the University of Melbourne to enhance their policies and curricula. These partnerships provide exposure to new ideas and practices. The government of India supports IT infrastructure and professional development, with the Indian Embassy facilitating collaborations with top Indian institutes like IITs. The collaborations facilitate exposure to new environments and innovative practices, benefiting students and faculty (Ministry of Education, Bhutan, 2024).

Bhutanese universities also engage in community service and independent certificate courses, and the primary focus remains expanding international partnerships and leveraging these collaborations for educational advancement and knowledge sharing. One respondent explained that the university is exploring alternative revenue sources to reduce reliance on government funds, such as generating income from international students, conferences, and events. This initiative aims to create a more sustainable approach to faculty development funding while continuing to benefit from government support and guidance.

Section 6: Digital and Physical Infrastructure

Both respondents said the institution has modern digital infrastructure, including interactive conference rooms and classrooms with projectors and other digital tools. As its website indicates, the university includes ten constituent colleges and two privately affiliated colleges spread across the country. Students can access computer rooms and use college-provided equipment and digitised libraries.

The University has made significant strides on the digital front in recent years. It utilises a comprehensive University Information Management System with HR, research, financial management, and academic modules. It also includes class allocation, result management, and assessments.

One respondent said that the LMS, developed using Moodle open-source software, has existed since 2011. Internet connectivity has been significantly enhanced, with the government recently increasing the backbone from 1 gigabyte to 10 gigabytes and committing to a 50% reduction in Internet costs. The Bhutan Research and Education Network supports all colleges with high-speed Internet. The government provides free Internet to colleges, and recent updates show that Internet speeds for educational institutions are likely to be doubled.

Conclusion

The digital transformation of Bhutan's higher education system presents multiple challenges, including poor Internet connectivity and infrastructure disruptions, heavy reliance on government and external funding, and resistance to technology adoption.

Despite these challenges, several best practices have emerged. The strong government support through grants and infrastructure development, regular innovation initiatives like hackathons and camps, and robust faculty development programmes demonstrate a commitment to digital advancement. Implementing comprehensive LMS, platforms, and international collaborations has created a foundation for sustainable digital growth.

What is crucial is to maintain a balance between technological advancement and cultural sensitivity, ensuring equitable access to digital resources across all colleges. Encouraging meaningful collaboration between academic institutions and industry partners is also essential. Success in this digital transformation will require sustained commitment from all stakeholders, clear policy frameworks, and continued investment in infrastructure and human capital development.

India – A Case Study

India boasts the world's second-largest higher education system. According to the All-India Survey on Higher Education (AISHE) 2021-22, the country has 1168 universities, 45,473 colleges, and 12,002 stand-alone institutions. Student enrolment reached 43.3 million in 2021-2022, marking a significant increase of nearly two million students in a single year. The system has grown rapidly, with GER increasing by 18% from 2017 to 2022 (Ministry of Education, India, 2022).

The education landscape is diverse, with undergraduate programmes attracting the majority (78.9%) of students. Arts, Science, Commerce, and Engineering & Technology are the most popular undergraduate fields. Social Sciences and Sciences lead at the postgraduate level, while Engineering & Technology and Science dominate PhD enrolments. The University Grants Commission, established in 1956 under India's Ministry of Education, oversees this vast network. It is crucial in maintaining educational standards, providing grants, and advising the government on higher education development.

This case study explores the ongoing digital transformation in India's higher education sector, examining the challenges and opportunities presented by this shift.

Digitisation Policy for Higher Education

The Indian government has implemented several key digital education initiatives, such as the National Mission on Education through ICT (Ministry of Education, India, 2023). This mission focuses on providing connectivity, access devices, and content generation for HEIs. Notable platforms include SWAYAM (for online courses), SWAYAM Prabha (educational DTH channels), and the National Digital Library of India.

The National Knowledge Network (NKN), launched in 2010, connects over 1700 educational institutions through high-speed networks, enabling resource sharing and collaborative research. The Digital India program (2015), which introduced initiatives like the Academic Bank of Credits and the National Academic Repository, also helped improve digital infrastructure and services.

The National Education Policy 2020 marked a significant advancement in digital education

strategy. It established the National Digital Education Architecture (NDEAR) and National Educational Technology Forum (NETF) to develop standardised digital infrastructure and provide technological guidance. The policy promotes Open Distance Learning, blended learning and multidisciplinary education through digital means.

India's commitment to open resources is evident through initiatives like Shodhganga (digital repository for theses) promoting open-source software adoption. The National Strategy on Artificial Intelligence (2018) also includes education as a key sector for AI implementation.

These initiatives aim to enhance access, equity, and quality in higher education while working toward achieving a 50% GER by 2035.

Section 1: Organisational Digital Culture

Leadership and Strategy

The University Grants Commission's 12th Planning Commission guidelines emphasise faculty development in digital tools, including creating e-learning materials. Based on interviews with faculty from a public university in Maharashtra, it was observed that the academic performance indicator scores have been incorporated into faculty performance evaluations. However, some faculty members expressed resistance to this shift.

The National Education Policy has played a crucial role in shaping institutional strategies for digital transformation. For instance, a public university in Kerala has effectively aligned with state-level policies, especially those promoting open-source software. According to the faculty, this transition has led to significant cost savings and aligns with the objectives of the National Education Policy. The university has also leveraged the University Grants Commission regulations on inclusion to develop digital talking books for students with disabilities (University Grants Commission, India, 2022). The university in Maharashtra also adopted an open-source Linux based operating system right from the early stages of technology adoption.

Institutional decision-making and leadership vary across universities. According to a faculty member at a public university in Kerala, the institution demonstrates strong leadership in its digital transformation initiatives, with the previous vice chancellor playing a crucial role in navigating challenges and securing necessary support. The faculty member emphasised that, at the administrative level, there is a need to expedite processes to avoid delays in implementing projects. He also noted that delays in the rollout of digital services are widespread across the state's centres.

This university in Kerala utilises a bottom-up approach involving clusters of faculty, administrative staff, and various experts in decision-making and implementation. The faculty explained that they grouped 1500 university employees into clusters to gather feedback on digital infrastructure, software and other technical needs. Each cluster included an engineer, a software specialist, a teacher, and an administrative head. The feedback was prioritised by the Provisional Committee of Digital Infrastructure and Services, chaired by the faculty member. Implementation teams were formed for each project, and the projects were successfully launched after user acceptance tests. This approach, involving extensive discussion and confidence-building, reflected the general perspective of the employees. The university has also established its own dedicated data centre and on-premise cloud system, enabling more autonomy and flexibility in handling and storing data, as reported by the respondent. Moreover, the university has developed a digital document filing system where all the documents are digitised, and departments are connected via the Internet, which enables the staff to access the file from anywhere.

The public university in Maharashtra has an ITSM committee and an internal management centre that handles the Institute's IT needs. A lead program manager oversees the computer centre and ITSM, reporting directly to the Vice-Chancellor. Individual centres and departments have the liberty to experiment with new technologies, with a Centre of Excellence pioneering the adoption of new technologies such as Moodle LMS as early as 2005. Recently, the university drafted an institutional development plan that included a section on technology reported by one of the respondents. A committee brainstormed and created a technology vision for the university, focusing on infrastructure and adapting to emerging technologies. As part of its long-term plan, the university intends to appoint a

Chief Data Officer, a role that few institutes in India have initiated.

Interviews with faculty at a university in northeast India reveal that higher administration levels often influence policies and strategic decisions, which can create gaps if younger or less experienced individuals are not involved in decision-making processes. A faculty member noted, "While we are encouraged to adopt digital practices, strategic decisions are mostly taken by senior faculty or administrators, which leads to a disconnect in understanding the day-to-day challenges faced by junior staff". The geographic remoteness of the institution has posed additional challenges. Faculty members revealed that while national-level schemes such as the Pradhan Mantri Kaushal Vikas Yojana have facilitated the introduction of skill-based courses, the digital divide remains a significant issue. According to the faculty member, technological limitations due to the region's geography often make maintaining consistency in digital learning environments challenging.

Gaps between policy and implementation are evident across institutions. The university in Kerala faces challenges in implementing new initiatives due to the time gap between policy changes and their implementation. The focus on academic exercises and a lack of priority to IT infrastructure hinder the implementation of digital services. The university in Maharashtra lacks an explicit policy regarding technology adoption, focusing primarily on functional aspects like course registration and assignment submission on the institution's LMS. According to one faculty, despite the early adoption of technology, this university has faced challenges in administrative integration, with mark sheets and grade sheets still being handwritten as late as 2012.

Credit mobility, introduced in 2017, is often not fully translated into institutional practice in the universities in northeast India. A faculty member shared that despite institutional-level interest in digital tools, challenges remain in creating an interactive and collaborative digital learning environment. Although the faculty are enthusiastic about adopting new practices, the gap between national policy and the resources they have on the ground is significant. While initiatives such as SWAYAM and MOOCs are offered, the infrastructure to support continuous usage of digital tools still seems to be lacking.

People and Culture

Faculty development and digital literacy are key focus areas for all three institutions. For instance, the university in Kerala provides faculty training on creating MOOC SWAYAM courses and managing LMS. The university in Maharashtra offers workshops for faculty to become proficient in LMS usage, especially during the pandemic, and the university in northeast India conducts regular faculty development programmes to ensure skill enhancement and adoption of new teaching methods. The public universities from Kerala and Maharashtra mentioned Faculty Development Programmes under the Madan Mohan Malviya National Mission on Teachers and Teaching run by the University Grants Commission. These programmes aim to update faculty on Indian knowledge systems, pedagogical innovations, and technology.

Perceptions and attitudes towards technology too vary within and across institutions. Based on the interview at the university in Kerala, only a fraction of teachers are resistant to digitalisation, with concerns about cybersecurity and job security. A faculty member at the university in Maharashtra noted that the diverse adoption and attitudes towards technology at the institute are partly due to its nature as a social sciences university. He explained that the faculty ranged from those highly sceptical of technology to early adopters, with many falling in between. Despite this broad spectrum of views, unifying the two entities within the institute was a positive development. As for the university in northeast India, the focus has been on balancing digital and face-to-face interactions to ensure effective teaching-learning while maintaining privacy and best practices.

The digital culture within institutions has evolved significantly, particularly in response to the COVID-19 pandemic. At the university in Kerala, the faculty says that students have become adept at sourcing information from various digital platforms, including MOOCs, YouTube, and foreign university resources. The university in Mumbai experienced varying levels of Moodle adoption across different departments, with some effectively utilising it for engagement, teaching, and learning. In contrast, others primarily used it as a digital repository. According to a faculty member, post-COVID, more and more faculty

members have chosen to use MOOC platforms, such as SWAYAM, FutureLearn, and Coursera, to supplement their teaching.

The university in northeast India has integrated tools like Google Classroom, YouTube, and Zoom into its teaching practices, maintaining a hybrid approach to education even after the return to physical classes. Faculty members are encouraged to record lectures and share them through institutional LMS like Google Classroom. As one faculty member stated, they received training during the pandemic, and even after resuming physical classes, they are still encouraged to integrate digital platforms into their teaching.

Despite the push for digitalisation, attitudes toward technology vary. While many faculty members embrace digital tools, some remain sceptical, particularly regarding their long-term efficacy, with concerns around cybersecurity and hesitations about moving entirely online, especially in regions with poor connectivity.

The organisational digital culture in Indian HEIs reflects a complex interplay of national policies, institutional leadership, and individual attitudes towards technology. While there is a general trend towards increased digitalisation, challenges in implementation and varying levels of adoption across different departments and institutions persist.

Section 2: Knowledge Creation and Innovation

Teaching, Learning, and Research

Integrating digital technologies into teaching and learning has been significant across Indian HEIs. The university in Kerala has implemented digital classrooms with two-way communication, which proved invaluable during the COVID-19 and Nipah virus pandemics. The university had its LMS (Moodle) ready even before the COVID-19 pandemic, allowing students to attend classes online and access course materials remotely.

According to a faculty member, the university in Maharashtra utilises two primary platforms for online learning: customised versions of Moodle and EdX (for hosting online courses). They are entirely managed in-house, while online courses are partially developed by external sources and hosted on AWS. These platforms manage course materials, assignments, and discussions, facilitating knowledge sharing.

At the university in northeast India, the pandemic accelerated the adoption of digital tools. The university expanded its distance learning capabilities by utilising YouTube, with individual teachers creating channels to upload lectures. Google Classroom was used to distribute lecture notes and assignments, and Zoom facilitated live classes and real-time interactions.

In response to the National Education Policy, the university in northeast India has incorporated digitalisation into its curriculum, offering skill-based courses and collaborating with the linguistics department to share resources and materials. The university actively utilises the NPTEL and SWAYAM platforms to offer online courses, providing students with certifications that enhance their qualifications and learning outcomes. Despite the return to physical classes, platforms like YouTube and Google Classroom are still used, supporting a blended approach to learning. Faculty members noted that digital technology offers certain benefits but cannot fully replace face-to-face interactions. Some expressed concerns about student engagement, citing a lack of direct feedback in digital formats.

The university in Kerala runs distance courses, though they aren't completely online. The university in Mumbai has a centre for distance and open education, offering blended learning programmes, distance learning programmes, and short-term courses. The university in northeast India actively utilises the NPTEL and SWAYAM platforms to offer online courses to its students, providing certifications that enhance students' qualifications and learning outcomes.

Research activities and knowledge creation have also been impacted by digital transformation. The library at the university in Kerala has digitised resources like question papers and syllabi and offers a federated search tool. The university in Maharashtra has been involved in several significant research initiatives, particularly in technology-based collaboration and innovation. One notable project is a connected learning Initiative, a large-scale, multi-state, multi-partner effort in collaboration with

an Ivy League university in the US, various state governments, and research institutions.

Disruptive Technologies

The use of AI and disruptive technologies is at varying stages across institutions. What has emerged from the interviews with faculty across universities is that while AI and other disruptive technologies are still in the early stages of exploration in Kerala—primarily within computer science departments—there is growing interest in AI research at a university in Maharashtra. The teachers and centres develop their own guidelines for students on using AI. However, they lack a comprehensive policy on its use. Meanwhile, universities in northeast India integrate awareness about AI tools and their implications, including potential misuse, as part of their training programmes. Regular workshops are conducted on cybersecurity and disruptive technologies to ensure that faculty and students are aware of evolving risks and innovations. Additionally, Moodle remains a core platform for managing digital course content, supporting the institution's teaching and research activities. Efforts to integrate automated systems for attendance and course management and improve data handling and assessment are ongoing at the university in northeast India.

Section 3: Knowledge Development

Curriculum development and integration of digital content have been influenced by national policies and institutional initiatives. At the university in Kerala, students can opt for MOOC SWAYAM courses for credits. The university in Maharashtra runs courses on research management tools like Zotero for credits and has an M.A. in Education and Technology programme in a blended learning format. The university in northeast India, in response to the National Education Policy, has incorporated digitalisation and skill development into its curriculum, introducing several skill-based courses aimed at making students job-ready. These courses are available not only to students enrolled in the university but also to external participants, widening access to education and increasing employability.

Innovative teaching practices have emerged across institutions. At the university in Maharashtra, one professor has been using a blog to conduct a seminar-style course, which includes assignments, readings, and fishbowl sessions. The university in northeast India has recorded lectures and made them available on its portal, contributing to a robust digital learning ecosystem. While this practice was initially implemented in response to the pandemic, it has since become an integral part of the university's digital learning ecosystem, supporting both students and external learners. Faculty members at universities in northeast India are also integrating emerging technologies such as ChatGPT and Google Gemini into their teaching practices. Research methodologies and digital tools have also evolved. The university in Kerala provides plagiarism-checking services and online consultations to help students understand and address plagiarism issues, whereas the university in Maharashtra uses tools like Zotero and MAXimum Qualitative Data Analysis (MAXQDA) widely for research; they also provide access to Turnitin for plagiarism checking and Grammarly for writing assistance. The university in Kerala creates Zotero or Mendeley accounts for research scholars and provides them with a curated collection of resources.

Section 4: Knowledge Management and Use

Knowledge management systems and practices vary across institutions. The university in Kerala uses DSpace to create a digital repository of question papers and syllabi and has implemented the WhoFind discovery tool for comprehensive library searches. The university in Maharashtra utilises customised versions of Moodle and EdX platforms to manage course materials, assignments, and discussions. The university in northeast India employs Moodle as a key tool for managing learning resources, featuring automated attendance tracking and ensuring students access all required materials to earn their certificates.

Data analytics and decision-making practices are not uniformly developed across institutions. The IT director at the university in Kerala is aware of the potential of data analytics in utilising data for decision-making. However, he noted that its success

would depend on support from the administration.

Digital repositories and open-access initiatives are present in all three institutions. The university in Kerala actively participates in the Kerala Academic Library Network, a shared platform for academic resources of libraries. The university in Kerala also digitises and uploads the thesis to the Shodhganga-INFILIB network, a digital repository of theses and dissertations submitted to universities in India. In addition, the university has developed an institutional repository, similar to Shodhganga, that allows university faculty members and students to share their published works, either as full papers (if permitted by the publisher) or as bibliographic details.

The university in Maharashtra has a platform that systematically catalogues and archives student theses and allows departments to archive shareable documents. The library is part of this INFILIB network, an Inter-University Centre of University Grants Commission, and a network of all the universities that have adopted digital transformation.

The university in northeast India makes use of tools like Moodle, NPTEL, and SWAYAM to streamline course management and research processes. Moodle is the primary platform for managing learning resources, offering course materials, recorded lectures, and presentations. Recorded lectures are also accessible through Google Classroom, providing students with convenient access to resources. The platform features automated attendance tracking, requiring students to engage with and complete lectures to earn certification. In instances where students cannot attend live sessions, recorded materials are made available, ensuring they fulfil course requirements for progression.

The university in Kerala has a dedicated data centre and on-premise cloud developed in a hybrid model that manages data from various departments across the entire university. The university in Maharashtra has evolved its policies post-COVID to accommodate better online data collection, such as using Google Forms, but concerns about data security remain. The university in northeast India conducts regular workshops to enhance knowledge management and data handling skills, with awareness programmes about AI tools, cybersecurity, cyber threats and the ethical use of emerging technologies being part of the training for faculty and students. Such initiatives aim to equip students and faculty with the knowledge to handle digital tools effectively while adhering to research integrity standards.

Section 5: Knowledge Exchange and Partnership

Collaboration and partnerships within and outside institutions are evident across all three universities. The university in Kerala has implemented a collaborative information services initiative to support PhD research, creating Zotero or Mendeley accounts for research scholars and providing them with relevant literature. The university in Maharashtra has collaborated with external institutions to enhance its digital learning capabilities, partnering with a US-based Ivy League Institute to adopt the Open edX platform for MOOC development and a technology institute in Mumbai for training and expertise in implementing the platform. Collaborations are also among the departments to provide hands-on sessions on different types of software.

Faculty development and knowledge sharing are prioritised across institutions. The university in Kerala provides training to faculty on managing LMS and developing SWAYAM MOOC courses; the university in Maharashtra runs short-term programmes on inclusive education and constructive learning, which have a global reach, and the university in northeast India conducts regular workshops to train faculty on utilising digital tools and platforms such as NPTEL and SWAYAM.

The university in Kerala has produced over 700 digital talking books in collaboration with an NGO. The university also provides training to other professionals in KOHA and DSPACE.

Section 6: Digital and Physical Infrastructure

Digital infrastructure and connectivity have seen significant improvements across all three institutions: dedicated solar-powered data centre with a development team of 30 members and an on-premise cloud facility (Kerala); classrooms equipped with laptops, projectors, and screens; Internet connectivity becoming increasingly available in all

classrooms (Maharashtra); well-equipped digital infrastructure, including around 120 computers, supercomputers like Param Sheersh, and dedicated Internet access with 24/7 connectivity (northeast).

Moreover, both the universities in Kerala and Maharashtra have dedicated Internet connections from the National Knowledge Network (NKN), a high-speed network for educational and research institutions in India, managed by the National Informatics Centre. The university in Kerala prioritised LAN connections for faculty and staff due to its digital document filing system, which was implemented in 2012. Currently, the university is expanding its connectivity through a centralised system and additional Internet connections. Cybersecurity and data privacy are growing concerns. While one university (Kerala) has implemented a dedicated firewall system and other security measures, another (Maharashtra) ensures that students are informed about how their data will be used through consent forms. They conduct regular workshops in the northeast to enhance knowledge management and data handling skills, with awareness programmes about cybersecurity and cyber threats. The university in Kerala follows a hybrid model of developing digital infrastructure and relies maximally on free and open-source software. The university in Maharashtra has also adopted open-source software as the operating system for laptops and PCs.

Physical infrastructure and accessibility vary across institutions. While the university in Kerala has centralised equipment purchases through a sophisticated instrumentation facility centre, avoiding duplication and ensuring efficient use of funds, the university in Maharashtra has equipped faculty rooms with laptop and desktop setups. The university has invested in digital infrastructure in the northeast, including video conferencing and MOOC studios, to support digitised teaching and learning.

Availability of digital resources and content has increased across all institutions, from digitised question papers and syllabi (making them accessible online) to access to databases like JSTOR. The University Library in Kerala has adopted technologies to ensure inclusion – for example, Kibo Reader, which can scan and read text aloud in multiple Indian languages through PCs/Laptops/ Android Devices.

Examination and assessment practices have also been impacted by digital transformation. The university in Kerala has implemented a new software platform to streamline the examination process, utilising barcoding and a centralised system. One of the faculty members mentioned that the reforms significantly reduced the time to release the semester and reevaluate the results. The university in Maharashtra has completely digitised mark sheets post-2015. The university in northeast India employs AI checker tools like Turnitin to detect and prevent AI-generated submissions in response to the challenges posed by tools like ChatGPT.

While all three institutions have made significant strides in digital transformation, they face unique challenges and have adopted varied approaches based on their specific contexts and needs. The overall trend indicates a move towards greater digitalisation in Indian higher education, focusing on enhancing teaching, learning, research, and administrative processes through technology.

Conclusion

This analysis of three Indian universities demonstrates their significant progress in digital transformation, even though several implementation challenges still exist. It shows that successful digital transformation depends on three critical factors:

1. Leadership and Strategy: Institutions with clear digital strategies and committed leadership, such as Kerala University's bottom-up cluster approach, could lead to more effective implementation of digital initiatives.

2. Infrastructure and Resources: Regional disparities and resource constraints continue to affect implementation, particularly in geographically challenged areas.

3. Adaptation: The COVID-19 pandemic accelerated digital adoption. However, varying faculty acceptance and technical proficiency levels indicate a clear need for continued support and professional development.

Nepal – A Case Study

With a population of approximately 30.8 million in 2023 (World Bank, 2023), Nepal is a federal democratic republic with a parliamentary system. The country is governed by the Constitution of Nepal (2015), with a president as the ceremonial head of state and a prime minister leading the government.

Higher education in Nepal began with the establishment of Tri-Chandra College in 1918. Tribhuvan University (TU), founded in 1959, was Nepal's sole university until adopting a multi-university system in the 1980s. As of 2024, Nepal has 11 public universities, all established through Acts of Parliament, ensuring access to tertiary education across the country's regions. The Ministry of Education, Science, and Technology (MOEST) provides strategic direction, with the University Grants Commission as a regulatory and funding body. The National Examination Board (NEB) manages certification for higher secondary education, which feeds into the university system.

Nepal launched its Education Sector Plan (ESP) (2016-2023), emphasising integrating digital tools in higher education to ensure equitable access to quality education. The policy highlights the development of e-learning platforms, digital resource repositories, and online certification processes, particularly in light of the challenges posed by the COVID-19 pandemic (Ministry of Education, Science and Technology, Nepal, 2024).

The National Education Policy of Nepal (2019) established comprehensive guidelines for educational digitalisation. The policy emphasises digital curriculum development, Information and ICT capacity building for educators, and expansion of digital infrastructure to enhance educational access in remote regions. Moreover, the policy framework promotes international academic collaborations for research advancement and exchange initiatives (Ministry of Education, Science and Technology, Nepal, 2019).

Nepal's 15th Five-Year Plan (2019-2024) outlines strategic priorities for the education sector, particularly emphasising TVET. The plan focuses on digital transformation in education, infrastructure development, and curriculum modernization aligned with global standards (National Planning Commission, Nepal, 2019).

The Ministry of Education oversees digital transformation initiatives in higher education, supported by the National Information Technology Center (NITC) and collaborations with private technology firms. Metrics to evaluate progress include increased Internet penetration rates in educational institutions, enhanced STEM performance, and reduced dropout rates in rural areas (Ministry of Education, Science and Technology, Nepal, 2024).

Nepal has been gradually integrating digital technologies into its higher education sector. However, despite progress in adopting online platforms, such as Virtual Learning Environment systems, and the increasing availability of Internet services, access to technology remains a significant barrier.

Urban areas in Nepal enjoy better Internet access than rural regions, where broadband connectivity is sparse and unreliable. Ownership of personal devices is notably lower among students in rural areas, exacerbating the digital divide, with students from low-income households facing significant technological access barriers (Khan et al., 2023).

Recent initiatives, such as the Digital Nepal Framework (2019), aim to enhance digital literacy and support the growth of a knowledge-based economy, including in the education sector. However, limited technical support, lack of professional development for faculty, and inadequate regulatory frameworks continue to affect the full-scale integration of digital technologies in Nepal’s higher education scenario.

This case study examines the challenges and lessons learnt during the ongoing digital initiatives in Nepal’s higher education sector.

Section 1: Organisational Digital Culture

Leadership and Strategy

HEIs in Nepal seem to be working towards keeping up with the growing digital transformations. However, gaps still exist between policies and implementation.

The Nepal Open University (NOU) was the first open university in the country to offer online learning, especially for people who cannot attend traditional schools. However, despite being a pioneer in digital education, the university faces many challenges.

A respondent reported that the approach to digital transformation has been more traditional. He highlighted the need for unified policies: they have different policies across different universities. Each university has its own directives.

Another respondent also discussed the significant gap between policy formation and actual implementation, especially in integrating online learning models across institutions. While various ICT initiatives exist in the education sector, there has been inconsistent adoption across universities due to resource limitations and coordination challenges.

Post-COVID, many educational institutions reverted to traditional classroom settings, highlighting a lack of commitment to sustaining online education. The respondent highlighted the need for more collaborative decision-making to address implementation challenges at the institutional level.

People and Culture

Digital adoption in universities varies significantly among faculty. According to one of the respondents, younger professors, often trained in more digitally advanced environments, readily embrace tools like AI, collaborative apps, LMS platforms and other technologies to enhance learning. In contrast, senior faculty struggle with these transitions, preferring traditional teaching methods. Regular training programmes, especially through central libraries, help faculty and students access online resources and become more confident in the use of digital tools and LMS. However, senior professors still face challenges. He mentioned that senior faculty face difficulty transitioning to new technologies, particularly in areas like finance, where the complexity of the content makes technology integration more difficult. They may require more targeted support, especially those teaching complex subjects. Moreover, extending the focus on fostering a collaborative digital culture beyond the leadership level could help address some of the persistent challenges. This generational divide is further echoed in the University Grants Commission Digitization Report (2020), which highlights that younger faculty members are more inclined to use digital tools for teaching, while older faculty members tend to resist such changes due to their preference for traditional teaching methods (University Grants Commission, 2020).

Another respondent pointed out the need for strong leadership and administrative support in advancing digital initiatives at the university. The university has a LMS with discussion forums, which is actively used for digital learning and interaction. The NOU faculty shared that WhatsApp is being used as a communication tool to engage students, as it provides an accessible and practical way to connect. Though limited, these steps demonstrate how faculty work within existing constraints to encourage a digital learning environment. To further improve the digital culture, it would be helpful for leadership to address internal challenges and prioritise the seamless implementation of digital initiatives.

Section 2: Knowledge Creation and Innovation

Teaching, Learning, and Research

Digital technologies are increasingly integrated into Nepalese teaching and learning environments. There has also been some shift in teaching methods from the traditional lecture method to the modern interactive method and use of the audio-visual method. (University Grants Commission, 2020). In the University, digital tools like whiteboards and LMS platforms allow students to access recorded sessions and learning materials. Tools such as R, SPSS, and business simulations are also becoming more prevalent in classrooms. Collaborative programmes with international institutions like South Korea's Handong Global University further contribute to expanding Nepal's digital education reach.

Online classes have been implemented through platforms like Microsoft Teams, but there are challenges in digitising other areas like assessments. Institutions are also attempting to cater to the digital learning requirements of students from marginalised backgrounds, but gaps in digital accessibility continue to be an administrative challenge.

Integration of Digital Technologies

After COVID, the universities began conducting assessments online, and this process is still ongoing. However, as noted by a respondent, no formal programme exists to build digital skills among faculties. Faculty development in this area primarily relies on informal efforts, often driven by individual faculty members or specific departments. In contrast, another respondent shared that they have regular training programmes on accessing online resources, which are organised by the central library.

Section 3: Knowledge Development

Curriculum Development

In one university, innovative practices such as open-book examinations and continuous assessment systems are being used to improve educational outcomes. Faculty at the university mentioned using open-book examinations to enable teachers to create effective exam questions. Collaborative efforts with institutions like the Barcelona School of Management have helped integrate sustainability-focused courses, emphasising real-world applications.

Research

Digitalisation is reshaping research practices, with faculty increasingly using data analysis tools like R and SPSS. Despite challenges related to limited resources, faculty members remain engaged in research, particularly in collaboration with local governments. Research programmes that involve students are also being implemented, and universities provide small grants for conferences and international collaborations. However, research in humanities and management continues to face significant financial constraints.

Section 4: Knowledge Management and Use

Technology and Data Management

LMS and digital repositories are essential to Nepal's HEIs, offering centralised access to recorded lectures, academic materials, and other resources. However, interviews suggest that cybersecurity measures must be tightened to avoid risks to sensitive data.

Knowledge Exchange

Nepal's HEIs have developed extensive local and international partnerships. One university has international partnerships with institutions like Angam Global University, Chinese University, and the Barcelona School of Management, which help develop global leadership programmes and incubators for research and entrepreneurship. A faculty member specifically highlighted the international nature of their collaborations where professors from France and Korea, get to interact with the students online. Partnerships with local governments have also been critical in supporting research activities. These collaborations facilitate knowledge dissemination and ensure that research is aligned with local needs, particularly in addressing social and economic challenges.

Recently, one university applied for a collaboration with a European university, where they are developing concept papers in partnership with four Nepali universities and two universities from Poland. Moreover, Nepali students working abroad in countries like Kuwait, Malaysia, and Japan are taking online courses provided by universities in Nepal.

Section 5: Digital & Physical Infrastructure

Digital Infrastructure

One respondent suggested that to support faculty and improve teaching effectiveness, it would be beneficial to consider providing essential resources like laptops or upgraded technology. There is also room for improvement in enhancing students' access to Wi-Fi, e-libraries, and subscriptions to resources like Jstor. This would help improve access to articles and books unavailable through other sources (University Grants Commission, 2020).

Another interviewee mentioned that Internet connectivity remains a significant challenge, particularly in rural areas, where students face frequent disruptions. While urban students have

more stable access, it would be helpful to address these connectivity issues to ensure equitable access for all students. He also raised concerns about limited bandwidth, which affects virtual interactions. Both interviewees suggested that improving Internet infrastructure could support smoother communication and online learning experiences. Although tools like Moodle and Microsoft Teams are available, they are not fully utilised. Strengthening support for the effective use of these tools could enhance the overall digital learning environment and culture.

International funding from UNESCO and the World Bank has helped improve relevant policies, plans as well as physical infrastructure, including computer labs and small libraries. Inclusivity initiatives, such as scholarships for marginalised groups, aim to ensure equitable access to education.

Respondents from both universities say they have developed different approaches to assessment. One university has implemented online examinations post-COVID, while another has adopted open-book examinations and continuous assessments to address the challenges of monitoring online tests.

Conclusion

Nepal's HEIs are navigating a complex digital transformation journey marked by notable progress and persistent challenges. While initiatives like distance education and international collaborations highlight the potential of digital technologies, infrastructural limitations and policy-implementation gaps remain significant barriers. Addressing these issues through unified national strategies, enhanced faculty development, and equitable resource distribution will be critical for realising a robust digitised educational ecosystem in Nepal.

Sri Lanka – A Case Study[9]

The growth of higher education in Sri Lanka has seen significant changes since the introduction of free education in 1945, which greatly increased access to universities. The history of higher education in the country began with the establishment of the Colombo Academy in 1859, which prepared students for exams from the University of London. The University of Ceylon was established in 1942 by merging the Ceylon Medical College and Ceylon University College, which was a key moment in the development of higher education. By the early 2000s, the government had opened a university in each of the nine provinces, establishing 15 state universities by 2005 (Wickramasinghe, 2018).

A World Bank report highlighted that many graduates did not meet private sector requirements, especially in English and soft skills in Sri Lanka. To address these problems, the Sri Lankan government, with support from the World Bank, initiated the "Improving Relevance and Quality of Undergraduate Education" project (2003-2009) focused on establishing quality assurance processes and encouraging competition among universities. This was followed by the "Higher Education for the Twenty-First Century" project (2011-2015) (Asian Development Bank, 2016).

Recently, some institutions, like the Sri Lanka Institute of Information Technology, were permitted to award their own degrees. The government established the Ministry of Education, Science, and Technology to help organise and improve these HEIs (Ministry of Education, Higher Education, and Vocational Education, Sri Lanka, 2024).

Digitalisation Policy for Higher Education

The "Policy for Digital Transformation of Education," introduced in May 2023, aims to modernise Sri Lanka's educational system by equipping students and educators with essential digital tools and skills. In response to the COVID-19 pandemic, which highlighted significant gaps in online education access, the policy sets ambitious goals for infrastructure investment, ensuring that by 2025, all institutions will have high-speed Internet and modern digital devices. Continuous professional development for teachers is a key focus, with regular training sessions to help them adapt to new technologies. The policy also promotes open-source software and repurposing existing facilities for digital learning as cost-effective solutions. Funding will be

[9] The case study is informed by data collected through semi-structured interviews as outlined in the research design section and may include individual opinions and perspectives.

sought from government and private sector grants to support these initiatives. A steering committee will oversee implementation, ensuring that objectives are met through regular assessments and feedback (Ministry of Education & ICTA, 2022).

One of the interviewees discussed adopting an LMS in their academic environment. He mentioned that despite providing numerous training programmes, only 60 to 70 percent of academics have adopted the LMS. The remaining academics continue using traditional methods, such as printing materials and social media platforms like WhatsApp and email, to share resources. The interviewee believed that LMS adoption levels vary based on the type of lecturers, age, and technology knowledge.
To accelerate digitalisation, a laptop loan scheme was started. The laptops, covered at a maximum price of Rs. 75,000, must include a three-year comprehensive warranty, a pre-installed operating system (either Windows or Linux), and antivirus software.

The loan amount can go up to Rs. 75,000, which students will repay in 36 equal, interest-free monthly instalments beginning the month after the laptop purchase. The Student Administration Office of the university will issue a recommendation letter and other necessary documents for the student's preferred bank (Ministry of Education, Higher Education and Vocational Education, Sri Lanka, 2024a).

One respondent stated that the students of state universities often view laptop loan schemes as a burden. He mentioned that at his university, which is a state university, students typically do not use such schemes. Private university students more commonly avail of these facilities.

Government policies in Sri Lanka reflect a proactive stance towards supporting digital integration in education, with initiatives to expand Internet access and establish computer centres in HEIs. The government aims to enhance digital literacy among students, which indicates a commitment to equipping the educational sector with the necessary resources to keep pace with global technological advancements (Ministry of Education, Higher Education and Vocational Education, Sri Lanka, 2024b).

According to a respondent, there are visible efforts to enable digital access, though these efforts may not be uniform across all institutions. One respondent discussed the digitalisation plan's impact on higher education and his university. He mentioned that the plan has led to an increase in student enrolment, necessitating using technology to manage this growth. In Sri Lanka, most students rely on free education and prefer state universities over private ones. To accommodate this, the university seeks funding from the government and other sources to provide necessary resources. The university has several computer labs, online learning rooms, and other facilities like international language programmes and an e-library system. Students utilise these resources to enhance their learning experience.

However, funding challenges persist at the institutional level, particularly for smaller institutes. For example, maintaining essential tools like Zoom for extended lecture hours incurs costs beyond what free versions offer. As the interview respondent explained, they have to buy a license to meet the demand for two-hour sessions. Since government funding does not cover all digital expenses, the institute relies on self-funding courses to bridge financial gaps. While this model sustains essential online functions, it highlights a limitation in external support for comprehensive digital access.

Institutional leaders, such as vice chancellors and deans, actively seek to improve digital readiness within their universities, understanding the necessity of digital skills to stay competitive globally. However, access disproportions persist, affecting students' ability to engage with digital learning tools fully. Partnerships with larger universities or specialised institutes could provide additional expertise and resources, especially for smaller institutions with limited staff.

Section 1: Organisational Digital Culture

As a research participant reported, the shift to online education at this Sri Lankan university, initially driven by the COVID-19 pandemic, has since evolved into a sustainable part of its academic framework. This sentiment echoes a broader trend. During the lockdown, the university quickly adapted to

digital platforms, enabling continuity in delivering postgraduate diplomas, certificates, and other programmes. The integration of online education, which started as a temporary measure, proved highly effective, prompting the institute to adopt a dual system to cater to local and international students. This inclusive approach accommodates students who cannot attend on-site, including foreign students from countries like China, who otherwise would face high costs for travel and living. The institution is currently discussing the future of this online system, weighing whether to transition back to in-person-only education or continue with a blended approach that has thus far enhanced access and flexibility.

As the university embraces digital culture, there is a growing recognition among faculty and administrators of the importance of keeping pace with emerging technologies to maintain educational quality and relevance. Decisions about technology acquisition and distribution are overseen by directors and technical committees, underscoring a structured but sometimes slow-moving process. The shift towards digital exams has highlighted new challenges, such as concerns over academic integrity. The faculty feel that there is a need for a more robust approach to digital governance within institutions to prevent such misuse.

Faculty meetings, board recalls, and management sessions have also been adapted, allowing remote participation when needed. The commitment to digital culture is evident at institutional levels, from the director-led acquisition of technology to departmental oversight, creating a supportive structure that encourages both traditional and innovative learning environments. A participant observed that if an institute wants to keep a subject alive and if they want to maintain an edge, they have to become familiar with emerging technologies.

Section 2: Knowledge Creation and Innovation

Teaching, Learning, and Research

Higher education teachers are responsible for continuously updating LMS and creating high-quality, relevant e-learning content incorporating multimedia elements to improve the learning experience (Thenuwara & Sanjani, 2024).

The adoption of technology in teaching and learning at one of the universities has been a gradual process, influenced by both traditional practices and the need to adapt to newer tools and systems. Historically, senior faculty members who have long adhered to traditional teaching methods have slowly embraced technological changes. However, a respondent noted that the introduction of LMS and digital teaching tools has begun influencing their attitudes and shaping the teaching landscape, even among faculty members initially resistant to change.

There is a noticeable divide between younger and older faculty members regarding the adoption process. As one respondent highlighted, younger faculty are more likely to integrate time management and innovative teaching methods, utilising digital tools like Zoom, social media, and AI to enhance their teaching. The respondent shared that concerns remain, particularly regarding ethical issues and resistance to change, with some faculty members only adapting to technology due to compulsions.

One of the interviewees discussed the implementation of hybrid learning at their university, confirming that some courses are conducted both in class and on Zoom. He explained that during the COVID-19 pandemic, the university faced challenges with accommodation facilities and managing the number of students. As a result, they had to conduct lectures for only one batch physically, while the other two batches attended classes via Zoom. He stated that distance learning mostly goes online and uses LMS and Zoom. They also conducted occasional seminars for these programmes.

One of the respondents mentioned that his research focus in finance now is linked to technology in finance. He emphasised his focus on “finance and technology in India”, noting that digital transformation has impacted various areas beyond finance. The respondent highlighted the importance of this shift, mentioning that in the last few years, they have also had a research conference, and the central theme was “Digital Transformation for Sustainable Future”. He also pointed out that several faculty and university-level research conferences are now centred around technological changes.

Technology and Data/Knowledge Management

The respondent focuses on integrating AI into academic practices at their university. He mentioned that AI tools like ChatGPT are commonly used to prepare and compare course materials with existing resources. The respondents reported using AI to prepare the course material and compare it with the real material they have. He also highlights the increasing availability of specialised AI tools for various academic purposes, including coding in languages like Python. The respondent notes that most of their colleagues and students are using AI tools, indicating widespread adoption of AI tools among faculty and students.

One of the interviewees discusses the university's data collection, handling, and security approach. He mentioned that the university uses a dedicated server system to ensure data privacy and security. He said that data privacy means they are using a dedicated server system in their university. The university collects student feedback, which is submitted to the faculty board by the research and innovation cell and the internal quality assurance cell. This feedback is used to analyse and improve various aspects of the university's operations.

Section 3: Knowledge Development

The university's approach to knowledge development through curriculum and digital integration has seen moderate advancements, particularly in management and science. These areas are aligning their curriculum to match industry developments and technological growth. However, digital integration across the curriculum is still uneven, especially in fields such as humanities, where the use of technology remains limited. Digital resources, where available, primarily support basic learning tools, such as the production of PDFs and some online content made available by the library. Faculty involvement in webinars and online conferences further supplements curriculum content, though these efforts largely stem from individual initiatives rather than structured, institutionalised programmes. According to Interviewee, knowledge-sharing and technology-based learning initiatives occur more at the "individual level", highlighting the lack of a coordinated strategy for digital content integration within the curriculum.

Innovative teaching practices have emerged as a response to digital demands, especially in the context of online education. Teaching online has required faculty to adopt more structured and systematic methods, with teachers preparing more rigorously to engage students virtually. This shift has also highlighted the need for new teaching tools and techniques, though infrastructure limitations mean these tools are not always available. Faculty rely on basic digital platforms like Zoom, where they interact with students using interactive whiteboards and encourage participation through note-taking and shared discussion spaces. However, assessments remain traditional, primarily through assignments and final exams, with few opportunities for online presentations or digital submissions. The integration of research methodologies involving advanced digital tools is also limited; technologies like MaxQDA and generative AI, which support data analysis, are largely absent. In some management research, digital tools are used to analyse online data, but technology has minimal application for humanities, which rely heavily on ancient texts and comparative studies. This cautious approach to technology adoption underscores both the progress and the existing gaps in the university knowledge development framework.

Section 4: Knowledge Management and Use

One of the interviewees discussed using statistical data from the LMS and Zoom to measure academic staff engagement and inform decision-making at the university. He mentioned that the LMS provides a statistical report on its usage by academic staff, offering insights into the extent of LMS adoption. Similarly, Zoom statistics help understand the usage patterns of online classes. The interviewee said that based on statistical data and the implementation of this technology, it's understood how many academics are using it. This data-driven approach enables the university to identify areas needing improvement and to organise training programmes and workshops accordingly.

Additionally, the university conducts orientation programmes and seminars to help students, especially those from remote areas, learn how to use these technologies. The interviewee explained that some students come from remote areas, so they don't know how to use the LMS. Then, they teach

them and provide seminar programmes on how to use all these technologies.

Section 5: Knowledge Exchange and Partnership

The culture within the university emphasises a strong desire for knowledge and self-improvement among faculty, yet limited resources and formal support impact its growth. Faculty members are often driven by personal motivation to expand their knowledge, particularly in digital literacy and online resource utilisation. However, as the Research participant explained, “there is no systematic approach” to professional development, suggesting that structured training programmes are rare. Many faculty enter higher education with only basic computer literacy, and without targeted development programmes, they often face challenges in effectively utilising digital tools. This gap leaves faculty largely reliant on self-directed learning or occasional MOU-based programmes, which may provide some exposure to external resources but do not comprehensively address their ongoing developmental needs.

Collaboration and partnerships, while present, are relatively limited in scope, as reported by one interviewee. However, the university has some MOUs with other institutions, and collaboration with industries or other external organisations is minimal. These MOUs allow for occasional online programmes, such as one conducted with a Buddhist institute in Malaysia, where the university delivered a fully online course. However, partnerships of this nature remain occasional rather than consistent. Faculty development and knowledge sharing primarily happen through informal efforts or individual experiences abroad. For example, experiences abroad, like Participant’s time in Taiwan, expose faculty to more advanced resources and technology, offering valuable insights but highlighting disparities in available resources. Consequently, while individual efforts foster growth, the absence of a structured, collaborative environment restricts broader faculty advancement and knowledge sharing.

Another interviewee highlights the collaborative efforts between their university and external partners, emphasising the significance of bridging the gap between practical and academic perspectives. They mention that the university recently participated in the Indo-Sri Lanka Research Conference, where they submitted a proposal for an article that focuses on the technological area, particularly on how technology is used in teaching. The interviewee explained that it mainly bridges the gap between the practical and academic theories perspective, which is so relevant to the technological area, especially from how they teach and use the technology."

The interviewee highlighted faculty and alumni associations' role in organizing and participating in research conferences and seminars, often with industry specialists. These collaborations enhance academic programmes and give students valuable insights into real-world applications.

Section 6: Digital & Physical Infrastructure

Digital infrastructure in higher education focuses on basic, functional tools to support teaching, but there is room for development in centralised technology management and digital security. As reported by one of the respondents, their institution does not have a dedicated technology department or a chief technology officer to oversee digital transformation initiatives and technology upgrades. This lack of centralised leadership means that decisions about technology and digital support may not have a unified direction, which can hinder comprehensive planning and the implementation of technology infrastructure.

The university relies on standard tools like interactive whiteboards and projectors, which help enhance the learning experience but do not offer the full range of possibilities that advanced educational technology could provide.

The respondent highlighted using interactive smart boards, replacing traditional whiteboards, to enhance

learning. This shift helps students and academics engage more effectively, allowing for better visual learning and concept understanding.
In addition to smart boards, the university employs a LMS to support its digital infrastructure. They primarily use the common version of Moodle due to financial constraints, as customising Moodle would be expensive.

Some universities exemplify technology integration in academic support through its extensive e-library services. The library offers various digital services, including online renewal and reservation, document delivery, online information search, WebOPAC, and access to various e-resources. The library also conducts user education programmes to enhance information literacy, such as access to scholarly databases, online search strategies, and web OPAC. These initiatives ensure that students and faculty can effectively utilise digital tools to support their teaching, learning, and research activities, aligning with the university's goal of achieving academic excellence (South Eastern University of Sri Lanka, n.d.).

The absence of organised awareness programmes on cybersecurity is also notable, as there is currently limited emphasis on educating faculty and students about digital safety. Without a structured approach to cybersecurity and technology planning, the university may face challenges in keeping up with emerging tech trends and safeguarding its digital infrastructure in the future.

The other respondent mentioned that while their university is developing its website to include information on cybersecurity and related topics, he has not seen a dedicated document on cybersecurity plans. He indicates that such information might be included in the website's terms and conditions, but he is unsure. In fact, the Policy Statements section of the Information Security Policy of that university outlines the responsibilities and expectations for all users regarding the management and protection of the university's information assets. It emphasises the need for compliance with security protocols and guidelines, ensuring that all faculty, staff, and students understand their roles in safeguarding information. The policy mandates regular training and awareness programmes to educate users about potential security threats and the importance of following established procedures. (University of Kelaniya Sri Lanka, 2024).

The findings suggest that successful digital transformation needs to consider local contexts while adhering to national standards. Future initiatives could prioritise equitable access to digital resources and promote pedagogical innovations across diverse institutional settings.

Conclusion

A significant challenge in the higher education sector in Sri Lanka has been the uneven adoption of digital tools across departments, with senior faculty members slower to embrace technology compared to younger colleagues. This has resulted in a generational divide in technology acceptance despite the COVID-19 pandemic acting as a catalyst for accelerating digital adoption. The shift to online and blended learning has proved beneficial, offering flexibility and access, particularly for international and remote students. However, it has also raised concerns about academic integrity and the need for better digital governance.

Best practices in the university include the proactive efforts of faculty members who have embraced online teaching and blended learning models, integrating tools like Zoom and LMS to enhance student engagement. Faculty members are also adapting their teaching methods to include more interactive, technology-driven approaches, especially in fields like finance and research, where digital tools like AI are increasingly being used. Moreover, the university has started leveraging data analytics from LMS and Zoom to monitor engagement and inform decision-making, a step forward in using technology for knowledge management and improvement.

Delimitations of the Research Study

Scope of Study: The case study focuses on Bhutan, India, Nepal, and Sri Lanka, as these countries provide a diverse yet manageable scope for analysing digital transformation in higher education. While other South Asian countries, such as Afghanistan, Bangladesh, the Maldives, and Pakistan, have unique contexts, they are outside the defined scope of this research.

Target Population: This study prioritises public universities and key stakeholders, such as government officials and senior faculty members, to gain institutional-level insights. While private universities and other stakeholders also play significant roles, their perspectives remain an area for future exploration.

Methodological Approach: The research employs a multimodal qualitative case study approach designed to provide insights into the experiences and perspectives of selected participants. This qualitative case study approach is chosen to provide in-depth perspectives, complementing but not seeking to replace broader quantitative analyses.

Timeframe of Data Collection: The data collection period was confined to approximately six months from March 2024 to October 2024, establishing a specific timeframe for the study. This timeframe enables a focused analysis of the current state of digital transformation up to 2024, providing valuable insights into present developments. It also lays the groundwork for future studies on emerging advancements beyond this period.

These boundaries ensure clarity in understanding within a defined scope and serve as a foundation for future research that may explore broader contexts and evolving trends.

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4 QUALITY EDUCATION

Sustainable Development Goals