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# UNIVERSITY NEWS

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## Special Issue

on

**DIGITAL TRANSFORMATION IN HIGHER EDUCATION**

on the occasion of

**AIU SOUTH ZONE VICE CHANCELLORS'  
MEET—2023-24**

hosted by

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI**

on

**OCTOBER 26-27, 2023**

## Themes/Subthemes for the Special Issues of University News-2023-24

S. No.	Zonal Vice Chancellors' Meets-2023-24	Theme/ Subthemes for Special Issues	Last Date to Contribute*	Date of Publication
1.	<b>East Zone</b>	<p><b>Integrating Bhartiya Knowledge System (BKS) with Higher Education</b></p> <p><i>Subthemes</i></p> <ul style="list-style-type: none"> <li>• Using Bhartiya Knowledge System-based Approach for Teaching-learning for Holistic Development.</li> <li>• Bhartiya Knowledge System in Sustainable Development.</li> <li>• Embedding Bhartiya Knowledge System for Futuristic Education.</li> <li>• Ancient Bharatiya Wisdom in Modern Context: Everlasting Relevance of Indian Knowledge System Heritage for Human Development.</li> <li>• Return of the Vishwa Guru Status: Strategies to Maintain and Propagate Ancient Indian Wisdom for Global Welfare.</li> <li>• Embedding Indian Traditional Knowledge into Advanced Scientific Research and Futuristic Technology to Optimise the Advantages.</li> <li>• Traditional Tribal Knowledge Treasure in India: How to Make Best Use of.</li> <li>• Challenges in Communication and Dissemination of Traditional Knowledge.</li> </ul>	November 06, 2023	November 20-26, 2023
2.	<b>West Zone</b>	<p><b>Future of Work and Skill Development</b></p> <p><i>Subthemes</i></p> <ul style="list-style-type: none"> <li>• Sustainable Careers: Navigating a Dynamic Workplace</li> <li>• Human-centered Skills in a Tech-driven World: Soft Skills and Emotional Intelligence</li> <li>• Resilience &amp; Adaptability: Impact of Gig Economy on Higher Education</li> </ul>	December 04, 2023	December 18-24, 2023
3.	<b>Central Zone</b>	<p><b>Nurturing Research and Innovation Ecosystem</b></p> <p><i>Subthemes</i></p> <ul style="list-style-type: none"> <li>• Collaborative Research Networks: Fostering Inter-disciplinary Research</li> <li>• Entrepreneurship and Innovation: From Idea to Impact</li> <li>• Innovative Funding Models for Research</li> </ul>	January 01, 2024	January 15-21, 2024
4.	<b>North Zone</b>	<p><b>Globalization and Internationalization of Higher Education</b></p> <p><i>Subthemes</i></p> <ul style="list-style-type: none"> <li>• International Collaborations and Partnerships: Building Bridges for Higher Education</li> <li>• Global Higher Education Policy and Regulation: Harmonizing Standards</li> <li>• Student Mobility and Diversity: Enhancing International Experience</li> </ul>	January 31, 2024	February 12-18, 2024

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**(OCTOBER 26-27, 2023)**

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# Table of Contents

Editorial	7
– <i>Sistla Rama Devi Pani</i>	
Setting the Tone for AIU South Zone Vice Chancellors’ Meet on Digital Transformation in Higher Education	9
– <i>Pankaj Mittal and Sistla Rama Devi Pani</i>	
Visvesvaraya Technological University, Belagavi: A Profile	11
1. Transforming Decision Making in Higher Education: The Impact of Artificial Intelligence Interventions	12
– <i>Srishti Saxena, Surbhi Sethi and Manju Singh</i>	
2. Impressions of Technology on Human Relationships	20
– <i>Parul Mishra</i>	
3. Artificial Intelligence in Education: Retrospect and Prospect	24
– <i>Sandhya Sharma and Prateek Chaurasia</i>	
4. Exploring the Concept of Artificial Intelligence in Education	30
– <i>Aman Singh</i>	
5. Recalibration of Credentialing in the Era of Flexible, Experiential and Personalized (FLEXPER) Learning	40
– <i>Neeraj Saxena</i>	
6. Beyond Degrees: Navigating the Digital Frontier in Higher Education Credentialing	43
– <i>Subhajit Panda and Navkiran Kaur</i>	
7. Faculty Development and Digital Pedagogies in Higher Education: Empowering Educators	54
– <i>Mercia Selva Malar</i>	
8. Issues and Concerns of Cyber Safety and Security among Online Students	59
– <i>Jasim Ahmad, Aerum Khan and Khushnuda Bano</i>	
9. Streamlining Digital Library Services: Harnessing the Potential of ChatGPT to Amplify User Experiences	66
– <i>Pramod Kumar Hota and Lopamudra Hota</i>	
10. Open Educational Resources in Higher Education	73
– <i>Anandam Durgaprasad</i>	
UNIVERSITY NEWS, 61(43) OCTOBER 23-29, 2023	5

11. The Impact of Online Learning on Higher Education: A Comparative Analysis of Traditional vs Virtual Classrooms – <i>Atul K Ghadge</i>	79
<b>Convocation Address</b> Anna University, Chennai	83
<b>Campus News</b>	86
<b>Communication</b> FutureSkills PRIME Programme for Re-skilling and Up-skilling – <i>M Kumar</i>	91
<b>Theses of the Month</b> <b>(Humanities)</b>	93
<b>Advertisement</b>	96

# EDITORIAL

## Subsuming into the Digital World: Is it Worth?

The message is loud and clear from all horizons of the world that digital transformation is our ordained future. Only those who adapt to change by adopting technology will thrive in the digitally transformed world. All others will perish. Love it or not!

After celebrating the Azadi ka Amrit Mahotsav, the 75<sup>th</sup> Anniversary of Independence, we are now in the *Amrit Kaal*. Vedic literature states that *Amrit Kaal* is a propitious time to initiate or embark on any new endeavor, guaranteeing its successful fulfillment. This *Amrit Kaal* aims to build upon a new India on the blueprint prepared for India@100. The vision is to create a prosperous and inclusive India where the development benefits are accessible to all. Digitisation obviously is the best vehicle to steer us towards New India.

What is not clear, however, is the real interpretation of digital transformation. Does it imply automating all tasks, digitizing information, optimizing processes, and minimizing the human touch? If it is so, is it worth to undergo this transformation? Here comes the role of Higher Education in Digital Transformation. To understand the role, it is essential to join the stream of digital transformation and experience exactly what is digital transformation; what are the areas in which we can bring about digital transformation; what specific steps we need to take for this transformation; do we need to create a framework for this transformation? And many more.

An important element of digital transformation is, of course, technology. But often, it's more about shedding outdated processes and legacy technology than it is about adopting new technology. It's also about enabling innovation. Alfred Tennyson explained it beautifully, "*The old order changeth yielding place to new. And God fulfils Himself in many ways, lest one good custom should corrupt the world.*" The AIU South Zone Vice Chancellors' Meet-2023-24 is on the theme **Digital Transformation in Higher Education**. AI and Analytics in Higher Education; the Future of Credentialing; and Digital Pedagogies are certain topics for discussion in the Meet. The deliberations will be made keeping in view the theme of the Annual Meet—'**Higher Education @2047**'. Each theme has its own significance for digital transformation in higher education.

Artificial Intelligence is an innovative technology that can carry out cognitive functions such as thinking, perceiving, learning, problem-solving, and decision-making. Amazingly, the science fiction films that we use to entertain ourselves are now not only a reality but part and parcel of our lives. Furthermore, data now drives every decision that must be made. The use of Artificial Intelligence in higher education is on the rise due to the proliferation of new AI tools that mimic human intelligence.

Shri Amitabh Kant, Former CEO of NITI Aayog rightly said, '*Democratic AI*' is necessary for inclusive progress in India. NITI Aayog published a report establishing the "National Strategy for Artificial Intelligence" and advocating for #AIforAll with the goal of embracing this technology and advancing India's specific needs and goals. The key areas are Health services (Improving accessibility and cost-effectiveness of high-quality care), Agricultural production (Increasing farmer income, raising agricultural output, and cutting down on waste), Education (Enhancing access to and the level of education provided), Infrastructure for smart cities (efficient connectivity for the expanding urban population) and Smart mobility and transportation (include safe and effective modes of transportation and enhanced traffic and gridlock control).

While artificial intelligence has great potential and many opportunities for higher education, it currently needs a big commitment of time and money from the Higher Education Institutions (HEIs).

Therefore, HEIs that are going to use AI must take into account a wide range of criteria to ensure that the adoption of AI will mark a turning point in their approach to teaching and learning and that it will benefit students, teachers, and the institutions as a whole.

The NEP-2020 strongly suggests adding Artificial Intelligence to the curriculum. NEP- 2020 states, “It is recognized that Mathematics and mathematical thinking will be very important for India’s future and India’s leadership role in the numerous upcoming fields and professions that will involve artificial intelligence, machine learning, data science, etc. The Artificial Intelligence Curriculum aims at developing the learner’s mindset and skill set towards artificial intelligence and how it is understood and applied. The main principle of artificial intelligence is to develop in immersive ways through problem-solving, creative thinking, and data analysis.

Technology is changing at the speed of light. While we are still struggling to exploit artificial Intelligence (AI), Generative AI is knocking on the door. It is a particular form of machine learning that takes a set of samples as input and learns from those samples to generate new content. ChatGPT, developed by OpenAI, and Bard, an AI experiment by Google, are examples of generative AI tools trained on massive text data to create novel, human-like text responses. This Generative AI indeed, is creating many apprehensions in human minds. Despite concerns about ethical issues, copyright, intellectual property, and biases in training data, generative AI is also integrated into higher education. This requires a thorough debate and consensus.

The level of formal learning of a student is validated by Credentialing. Validating skills and qualifications is crucial to the education system. All these years, they issued these credentials like mark sheets and certificates of passing out on water paper or seals. Now, credentialing is also being done through digitisation. This again is a matter of deliberation, as there are many teething issues still in the digitisation of credentials. Learning technologies and digital platforms are no longer an afterthought; they are critical for teaching and learning. The COVID-19 pandemic has accelerated the need for digital transformation.

Overall, Digital Transformation in the Higher Education context can be deciphered as *leveraging digital technologies to enable major educational improvements, enhance learner and instructor experiences, and create new instructional models through policies, planning, partnerships, and support*. Embracing Digital Transformation helps universities stay competitive in a digital world and achieve the purpose of *Amrit Kaal*. It will change the educational landscape significantly.

Hon’ble Prime Minister Shri Narendra Modi in his speech at G-20 Summit at Bali said, “Digital transformation is the most remarkable change of our era. The proper use of digital technologies can become a force multiplier in the decades-long global fight against poverty. Digital solutions can also be helpful in the fight against climate change, but these benefits will be realised only when digital access becomes truly inclusive and when the use of digital technology is widespread.”

Although AI will play an important role in driving digital transformation strategy, the work of implementing and adapting to the massive changes that go along with digital transformation falls to everyone. For this reason, digital transformation is a people’s issue or everyone’s issue. It is therefore the responsibility of all of us to ensure that technology does not overpower humanity. So, let’s follow the message of John McAfee and enter the frontiers of Digital Transformation.

*One who understands the relationships between the human heart and the human mind will always out-hack those who chase after an ever-changing technology (McAfee).*

**Sistla Rama Devi Pani**

# Setting the Tone for AIU South Zone Vice Chancellors' Meet on Digital Transformation in Higher Education

Pankaj Mittal\* and Sistla Rama Devi Pani\*\*

The Association of Indian Universities (AIU), one of the premier higher education institutions in India, was established in 1925. It plays a vital role in shaping Indian higher education by being a research-based policy advice institution to the Government of India in the fields of Higher Education, Sports, and Culture. One of the key activities of the AIU is to convene the Vice Chancellors' Meets at the Zonal and National levels to discuss various issues related to higher education. India is a country with a large geographical area, for ease of reaching out, AIU has grouped the member HEIs into 5 zones—East, West, North, South, and Central. Each zone is constituted of HEIs located in 5-6 States grouped in that Zone. Thus, 5 Zonal Meets and one National Vice Chancellors' Meet are organized annually. These Meets are important platforms not only to discuss the significant issues of higher education but also to play a catalytic role in finding solutions for different problems of higher education through collective wisdom. Further, AIU carries forward the voice of the participating leaders of higher education to appropriate agencies and authorities for their dispensation. Every year in the Annual Vice Chancellors' Meet, a specific theme that is of topical significance for the higher education community is taken up for discussion. As a run-up, subthemes related to the main theme are discussed in the Zonal Vice Chancellors' Meets.

## AIU Vice Chancellors Meets –2023-24

Projecting the landscape of higher education in the year 2047 shall involve a lot of speculation, as the future will depend upon the complex interplay of social, technological, economic, and cultural factors. Based on current trends and potential developments, it is the right time to discuss on theme related to prospective Higher Education in 2047, to provide a glimpse into the potential directions higher education could take by the year 2047, when India celebrates 100 years of independence. The *Amrit Kaal* from 2022 to 2047

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holds a lot of potential, in terms of shaping our higher education to meet the challenges of the 21<sup>st</sup> century. Therefore, for the year 2023-24, AIU has chosen the main theme as '*Higher Education@2047*' for the Vice Chancellors' Meets. Under this overarching theme, the following themes are proposed for the AIU's Zonal Conferences:

North Zone: *Globalization and Internationalization of Higher Education*

South Zone: *Digital Transformation in Higher Education*

East Zone: *Integrating Bhartiya Knowledge System (BKS) with Higher Education*

West Zone: *Future of Work and Skill Development*

Central Zone: *Nurturing Research and Innovation Ecosystem*

## South Zone Vice Chancellors' Meet on 'Digital Transformation in Higher Education'

Digital transformation in Higher Education is mainly the process of integrating digital technologies, tools, and strategies into various aspects of educational institutions to enhance teaching, learning, administration, and overall student experiences. It involves leveraging technology to modernize and streamline processes, improve access to educational resources, and prepare students for the digital age. It also includes exploring the role of technology in Higher Education, including online learning, virtual classrooms, and the integration of digital tools for better educational experiences, etc. The two-day event will include the following 3 Technical Sessions to discuss the concerned topics:

- The Future of Credentialling: Digital Badges, Micro-credentialing and Online Degree
- AI and Analytics in Higher Education: Transforming Decision Making
- Faculty Development and Digital Pedagogies: Empowering Educators

## The Future of Credentialling: Digital Badges, Micro-Credentialing & Online Degree

The future of credentialing is undergoing a

significant transformation due to technological advancements, shifts in the job market, and changing educational paradigms. Traditional forms of credentials, such as degrees and diplomas, are being complemented and sometimes even replaced by new, innovative approaches to validating skills, knowledge, and competencies. Discussion on this theme would allow us to examine how digital transformation is impacting the way credits are earned and recognized which may include deliberations on digital badges, micro-credentials, online degree programmes, etc.

### **AI & Analytics in Higher Education: Transforming Decision Making**

Artificial intelligence and data analytics are reshaping decision-making processes in Higher Education and being integrated into various aspects of Higher Education to enhance efficiency, improve student outcomes, and provide personalized learning experiences. However, with many advantages, it also poses ethical issues regarding data privacy, misuse by students, and the potential for replacing human interactions. HEIs need to carefully consider these factors and strike a balance between technological advancements and maintaining the integrity & ethical aspects of education and human connections. This theme would delve into how institutions are leveraging AI for student recruitment, teaching-learning, research, governance, financial planning, and institutional management. Discussions could also touch on ethical considerations and the responsible use of AI.

### **Faculty Development & Digital Pedagogies: Empowering Educators**

Faculty development and the integration of digital pedagogies are crucial aspects of Higher Education. As technology continues to reshape the educational landscape, it's important for educators to adapt their teaching methods and skills to effectively engage students in digital learning environments. Digital pedagogies which include teaching approaches and methods that leverage technology to enhance learning outcomes go beyond simply using technology as a tool and focus on creating engaging and interactive learning experiences.

This theme would focus on providing faculty with the necessary skills and support for effective digital teaching. Discussions may include deliberations on professional development for educators, digital pedagogies, integrating technology into the curriculum, fostering a culture of innovation among faculty, and

addressing challenges faced by instructors during the digital transition.

### **Participation**

Vice Chancellors of Indian Universities, Experts from the Government of India, Apex Bodies of Higher Education, and Academia will be speakers and Session Chairs. Experts from international organizations will also be invited to contribute. Discussions will be largely conducted in English. Sessions will be in a blended mode.

### **Format and Approach**

The Sessions will be of 1 Hour and 30 Minutes each. In each Session, there will be experts from Government, HEIs, and ICT. Presentations will be followed by interaction and Q and A. On the basis of deliberations, a commitment statement will be framed for the universities to further the cause of Higher Education in India. In addition to academic deliberations, capacity development initiatives will be taken by forming a group of Vice Chancellors who will work on various dimensions of Transformative Higher Education.

### **Conclusion**

Given the increased expectations of the Higher Education System due to its social relevance and impact, there is an urgent need to bring disruptive changes in the higher education system of the country. Immediate action, therefore, is required in all Indian higher education institutions to adopt such digital technologies, and pedagogies, which can lead to required transformations to make education relevant and useful in 2047. It is therefore inevitable for higher education institutions to take the lead and work toward digital transformation.

The recommendations of this Conference will constitute the discussions in the Annual Meet. On the basis of the recommendations of this National Seminar, '*University Action Plan on Digital Transformation in Higher Education*' will be prepared which will be a handy guide for Higher Education Institutions of the Country. A Policy Document will also be prepared and presented to the Government of India.

We anticipate a fruitful and meaningful interaction toward the resolution and realization of a common agenda for academic excellence through transformative higher education. This Vice Chancellor's Meet is but a stepping stone in the direction of building a new higher education system to build the New India. □

# Visvesvaraya Technological University, Belagavi: A Profile

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**Visvesvaraya Technological University, Belagavi is hosting the South Zone Vice Chancellors' Meet–2023-24 of the Association of Indian Universities (AIU), New Delhi on October 26-27, 2023.**

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Visvesvaraya Technological University (VTU) is one of the largest Technological Universities in India with 25 years of Tradition of excellence in Engineering, Technical and Management Education, Research, and Innovation. It was incepted in the year 1998 to cater to the needs of Indian industries for trained technical manpower with practical experience and sound theoretical knowledge. The VTU is headquartered in Belagavi Karnataka and has four regional offices in Bengaluru, Mysuru, Kalburgi, and Belagavi.

The university is currently having 214 affiliated colleges. It offers undergraduate programmes in 37 disciplines, PG programmes in 96 disciplines and Ph.D. and M.sc (Eng.) Research programmes with 7 faculty, over 3 lakhs Engineering Students study in the various institutes affiliated with the University.

We foresee the landscape of higher education to be extremely dynamic, challenging and fascinating too. We are constantly striving to strategically position ourselves in all emerging platforms of idea generation, creation of pragmatic knowledge, skills and competency development.

We firmly believe that it is indispensable to benchmark ourselves with global standards while staying firmly grounded in local contexts. As a premier technical university, we are the torch bearer with focused academic and research pursuits in Technical and Management education. Quality has always been the hallmark of all our endeavors.

Our diverse course curriculum across different disciplines is industry-driven and designed by experts to foster innovation and creativity. Our democratic governance models facilitate dialogue, debate, and resilience leading to sound policy and strategy formulation at all levels of the organization. Our National and International partners, with whom we have forged several key MoUs, have helped us explore various frontiers of knowledge.

The robust centers of Excellence in various disciplines, Accolades by National and International Agencies, and glittering alumni base across the globe are all a testimony of our phenomenal strides of growth and development. Our innovative practices in digitising the examination system, e-office management and CoE in niche areas like bio-fuel, nanotechnology and skill development are noteworthy. Our scintillating computer labs, CNC machine workshop and state of art infrastructure enrich the teaching and learning ambiance.

We are confident of a bright future as our resolve and commitment to the transformation of young minds is simply visionary.

We reiterate, with complete zeal and passion, our resolve to inspire learners and problem solvers in service of humanity.

□

**AIU WELCOMES THE SOUTH ZONE VICE CHANCELLORS' MEET–2023-24  
HOSTED BY VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI**

# Transforming Decision Making in Higher Education: The Impact of Artificial Intelligence Interventions

Srishti Saxena\*, Surbhi Sethi\*\* and Manju Singh\*\*\*

The primary aim of this research is to analyze the transformative role of AI interventions in decision-making processes within higher education, with a specific focus on their impact on blended learning during and after the COVID-19 pandemic. Utilizing a systematic literature review approach based on the SPIDER framework, this study reviewed 80 scholarly articles related to AI-enhanced Blended Learning. The articles spanned empirical studies, theoretical frameworks, and comprehensive reviews, providing a multifaceted perspective. The swift pivot to online learning during the pandemic led to the expedited integration of AI technologies in higher education. AI-powered platforms, such as virtual classrooms and adaptive learning systems, enriched the remote learning experience by offering functionalities like real-time engagement monitoring and tailored content recommendations. AI tools, including chatbots and analytics software, addressed administrative challenges and monitored student engagement, allowing for timely educator interventions. AI's integration in higher education, hastened by the challenges of the pandemic, has proven pivotal in enhancing the efficacy and quality of blended learning. Its capabilities, ranging from administrative efficiency to personalized student learning experiences, highlight AI's indisputable significance in the evolving landscape of higher education. Institutions should continue to harness AI's potential in the post-pandemic era to optimize blended learning outcomes and institutional efficiency further.

The advent of the COVID-19 pandemic profoundly influenced Higher Education institutions (HEIs). This precipitated the expeditious integration of AI technologies across multifarious dimensions of the educational milieu (Motz et al., 2021, Lemay et

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al., 2021)). The unforeseen transition to remote and online learning engendered unparalleled challenges for universities and colleges (Schultz & DeMers, 2020; Gonzalez-Ramirez, 2021; Aguirre et al., 2022). In this exigency, AI-powered virtual classroom platforms emerged as a pivotal resource. These platforms endowed educational institutions with functionalities encompassing automated attendance tracking, real-time engagement monitoring, and astute content recommendations, thereby augmenting the holistic virtual learning experience for students and educators (El Gourari et al., 2020; Saravanan et al., 2021). Concomitantly, AI-driven adaptive learning systems garnered significant prominence during the pandemic era. Owing to the remote and asynchronous nature of student learning, these systems demonstrated their efficacy by affordable tailored learning trajectories, dynamically adaptive course materials as per the individual progress, and providing expeditious feedback. This personalized pedagogical paradigm served as an efficacious means to address the heterogeneous array of learning requisites exhibited by students (Ciolacu et al., 2020; Atif et al., 2021; Peng et al., 2023).

Simultaneously, AI-driven adaptive learning systems gained prominence during the pandemic, proving effective in offering tailored learning trajectories, dynamically adapting course materials based on individual progress, and providing timely feedback in the remote and asynchronous learning environment (Ciolacu et al., 2020; Atif et al., 2021; Peng et al., 2023). Educational institutions recognized AI's potential to improve online learning quality, enhance administrative efficiency, and support students in the rapidly evolving educational landscape (Shultz & DeMers, 2020). The pandemic accelerated the rise of blended learning, combining traditional in-person instruction with online components, to ensure educational continuity during campus closures. Blended learning, characterized by adaptability, became a flexible approach accommodating diverse student needs and technological access levels. In the post-COVID era, blended learning is expected to remain a significant part of education, offering flexibility and adaptability. Institutions acknowledge

the benefits of blended models, investing in high-quality online resources and utilizing learning analytics to optimize instructional strategies and improve student outcomes. The incorporation of AI, among other emerging technologies, is poised to play a substantial role in enhancing the effectiveness of blended learning in the aftermath of the COVID-19 pandemic.

In our systematic literature review on AI-Enhanced Blended Learning, we meticulously applied the SPIDER framework to systematically analyze and synthesize insights from an exhaustive compilation of 80 scholarly research articles. The SPIDER framework, comprising Sample, Phenomenon of Interest, Design, Evaluation, and Research type, was instrumental in structuring our review process with precision. Initially, we curated a diverse assortment of research articles, ensuring comprehensive coverage of AI-Enhanced Blended Learning. Our focus was on the Phenomenon of interest, covering AI's integration within blended learning. The framework helped categorize research articles based on typologies, such as empirical investigations, theoretical frameworks, or systematic reviews. This systematic approach facilitated a structured and comprehensive synthesis of the existing academic literature on AI-Enhanced Blended Learning (Palomino et al., 2019).

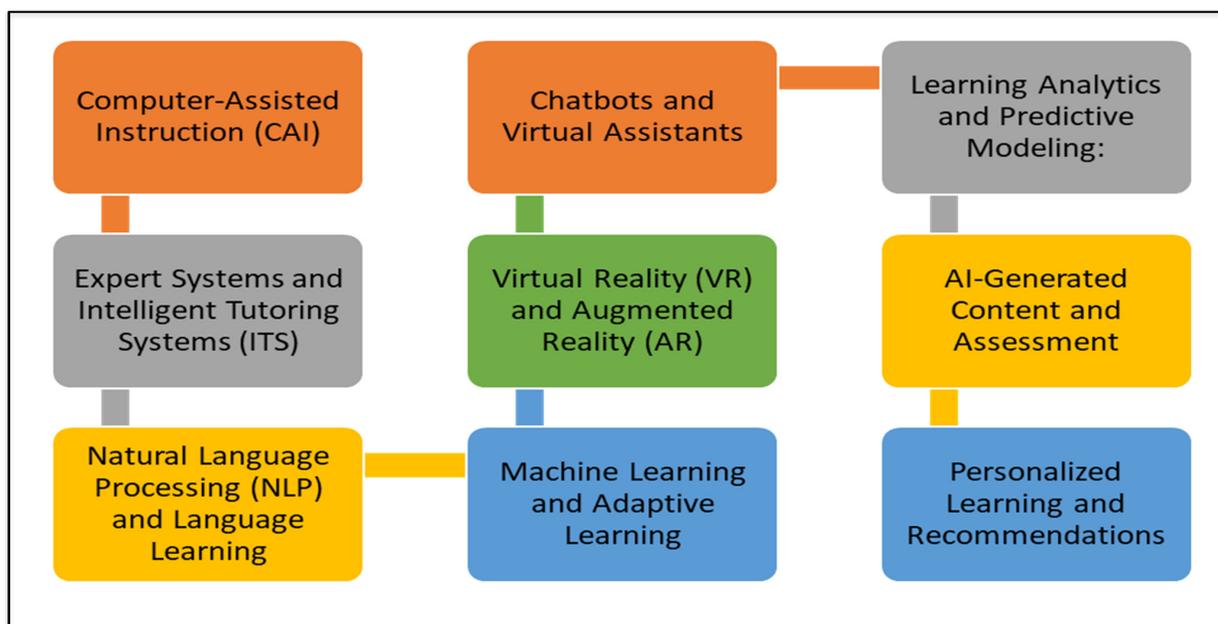
It is imperative to underscore that this review does not singularly emphasize the benefits of AI integration but also conscientiously addresses potential impediments, ethical considerations, and privacy-related concerns intertwined with AI's role in blended learning. This balanced approach endeavors to present a holistic perspective encompassing both the opportunities and risks inherent in AI adoption (Motz et al., 2021). In essence, for institutions contemplating the adoption of AI technologies in their blended learning initiatives, this review serves as a valuable reservoir of knowledge. It proffers insights into the multifaceted factors that warrant consideration during the decision-making process, encompassing aspects such as financial implications, scalability prospects, and pedagogical deliberations (Bordoloi et al., 2021).

The success of blended learning models, especially during unforeseen disruptions, is closely linked to the quality of the online components (Kexin et al., 2020). These digital components

became indispensable when traditional classroom instructions faced disruptions. Platforms enhanced with AI capabilities not only replicate classroom experiences but also offer advanced features tailored to individual student needs (El Gourari et al., 2020). Beyond the virtual classroom, the adaptation to blended learning necessitated a broader shift in pedagogical strategies (Saravanan et al., 2021) emphasizes the importance of asynchronous learning – a cornerstone of blended models – and highlights how AI-driven systems are uniquely suited to support such pedagogies. By analyzing student interactions, these systems can dynamically adjust content pacing, ensuring students remain engaged regardless of their learning speed (Atif et al., 2021).

AI has fostered a paradigm shift by establishing a two-way communication channel between students and institutions in the blended learning era. Traditionally, educators were solely responsible for knowledge dissemination; however, institutions are now attuned to student feedback and needs, facilitated by AI chatbots, analytics, and virtual assistants (Lemay et al., 2021). These AI tools provide platforms for students to voice concerns, seek clarifications, and receive instant support. Deployed to handle a surge in inquiries related to course matters, they offer quick responses to FAQs, reducing the burden on administrative staff and enhancing the student experience. AI-based analytics tools become indispensable for tracking student engagement and intervening promptly to address signs of disengagement or struggles (El Gourari et al., 2020, Saravanan et al., 2021). AI technologies also play a crucial role in generating digital learning materials. Automated content generators convert traditional course materials into interactive, online-friendly formats. AI-driven content recommendation engines assist students in discovering relevant resources, enriching their learning experiences. Furthermore, AI-driven assessment tools efficiently grade assignments and exams, providing immediate feedback and allowing educators to focus more on teaching and mentoring students. In times of financial uncertainties and budget constraints due to the pandemic, AI-based predictive analytics help institutions optimize resource allocation by forecasting enrollment trends and budget requirements (Ciolacu et al., 2018, Stöhr et al., 2020, Hamadneh et al., 2022). During financially challenging times, AI's predictive

**Figure 1: Evolution of the AI-Enhanced Blended Learning**



capabilities have been instrumental in guiding institutions in resource allocation, future planning, and risk mitigation (Hamadneh et al., 2022). Despite its potential, AI's role in blended learning is still in its early stages. Further research is needed to ensure ethical application, prevent biases, and achieve equitable outcomes. Blended learning, accelerated by pandemic disruptions, signals a future where AI plays a pivotal role in shaping adaptive, personalized, and globally accessible higher education (Peng et al., 2023; Stöhr et al., 2020).

### **Theoretical Framework: How AI Complements Blended Learning**

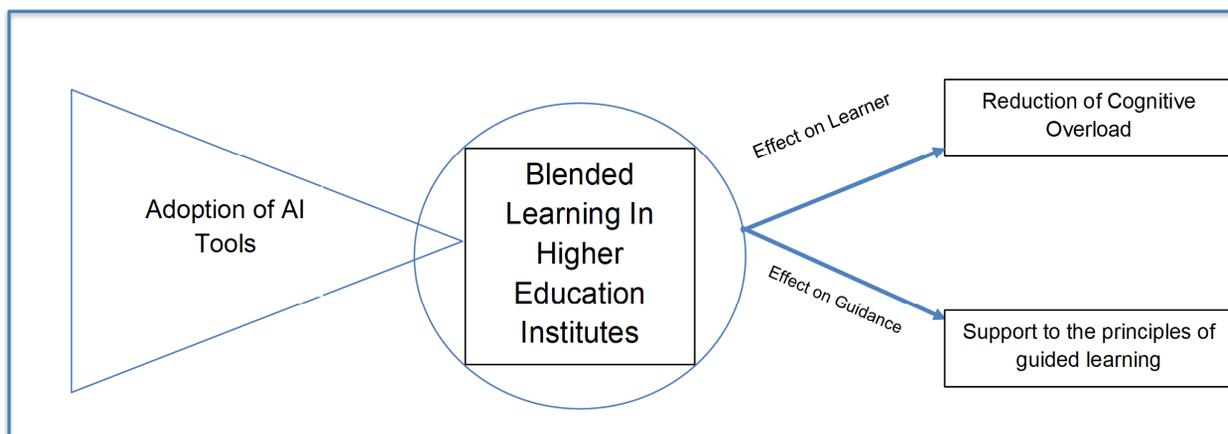
In the context of how AI complements blended learning, several educational theories and models can help explain the synergy between AI and blended learning. Here is a theoretical framework that elucidates this relationship:

In accordance with Cognitive Load Theory, it is imperative to optimize instructional design for the prudent allocation of cognitive resources, thereby improving the cognitive load encountered by learners (Plass et al., 2010, Sweller, 2011). The integration of AI-enhanced Blended Learning enables the adaptive adjustment of complex content to match learners' cognitive capabilities, consequently alleviating cognitive overload and fostering enhanced comprehension among learners (Koć-Januchta et al., 2013, Darabi & Jin, 2013). In the Zone of

Proximal Development (ZPD) theory, a distinction exists between independent learning and learning with guidance (Bruner, 1984, Veresov, 2004). AI-Enhanced Blended Learning has the capability to discern the spectrum of individualized ZPDs by continuously monitoring relevant data and extracting insights regarding areas where scaffolded support is needed. This approach aligns harmoniously with the core principle of guided learning within blended learning settings (Shabani et al., 2010, Ferguson et al., 2022).

AI innovations have profoundly reshaped the landscape of blended learning, elevating its effectiveness and adaptability. Adaptive learning platforms, employing AI algorithms, assess individual student progress and dynamically adjust course materials, ensuring personalized learning pathways. Natural Language Processing (NLP) tools facilitate online discussions, chatbots offer instant help, and language learning apps provide real-time translation, grammar checking, and tutoring. VR and AR technologies introduce immersive experiences, from virtual labs to 3D simulations, enriching experiential learning. AI-driven learning analytics analyze student data, empowering educators with insights for data-driven decision-making, personalized instruction, and timely interventions. AI algorithms generate diverse content, streamline content creation, and provide automated grading tools, saving educators time and offering immediate

**Figure 2 : Theoretical Framework Conceptualizing the Effects of AI on Learning Pedagogies**



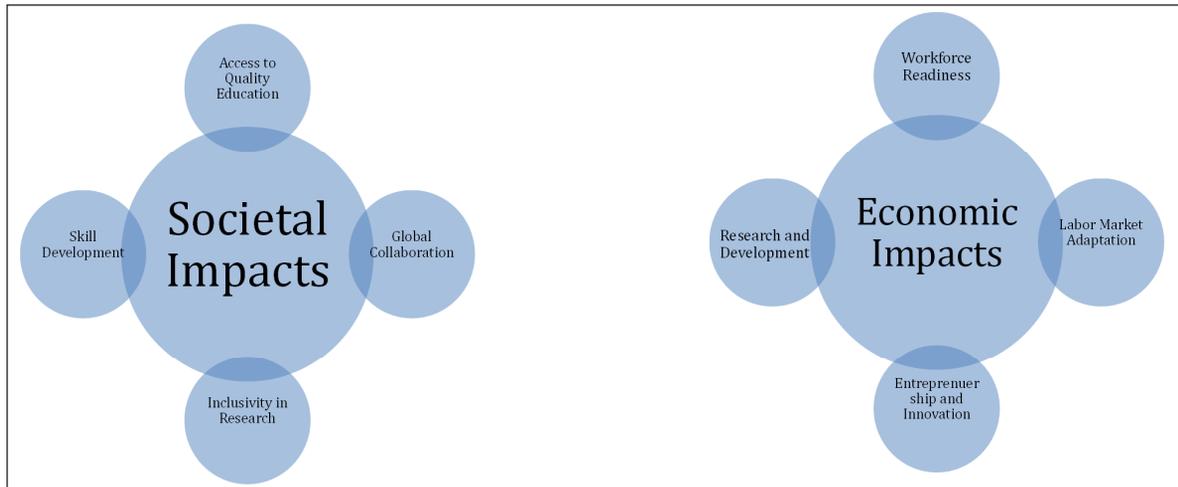
feedback. Chatbots and virtual assistants, powered by AI, deliver 24/7 support, aiding students with questions, administrative tasks, and tutoring. Personalized learning platforms recommend resources, adapting to student progress, while predictive analytics models forecast success and identify at-risk students. AI facilitates multilingual accessibility, translating educational content and

suggesting supplementary materials. AI-driven robots enhance interactive lessons in blended learning. Overall, these AI innovations augment the flexibility, personalization, and effectiveness of blended learning, providing tailored experiences for students and empowering educators with advanced teaching tools.

**Table 1: Illustrations of Transformations by Adoption of AI**

S. No.	Sphere of Decision-Making	Transformation by AI
1	Administrative Processes	Indian higher education institutions utilize AI-driven chatbots and virtual assistants to streamline administrative processes, handle student inquiries, offer course information, and aid in enrollment, ultimately enhancing overall service efficiency.
2	Accessibility and Inclusivity	In India, AI technologies boost educational accessibility by providing language translation tools for non-English-speaking students and assistive technologies for differently-abled students, promoting inclusivity.
3	Data-Driven Decision-Making	In Indian higher education, AI is utilized for comprehensive data collection and analysis, focusing on student performance, engagement, and course effectiveness. This data-driven approach informs decisions in curriculum design, resource allocation, and student support services.
4	Research Advancements	At Indian universities, AI accelerates research and innovation. Researchers employ AI algorithms for data analysis, simulations, and predictive modeling, benefiting various domains, including healthcare, agriculture, and engineering. This AI-driven approach leads to significant breakthroughs and practical advancements.
5	Skill Development and Employability	Indian higher education institutions are integrating AI courses into their curricula, aiming to equip students with relevant skills and knowledge, enhancing their employability in India's growing technology sector. The focus is on preparing students for the changing demands of the job market.
6	Early Warning Systems	Certain academic institutions utilize AI-powered early warning systems designed to identify students facing academic challenges. This proactive approach enables timely interventions, resulting in decreased dropout rates and heightened student success.
7	Alumni Engagement and Fundraising	Utilizing AI-driven analytics, universities enhance alumni relations by employing predictive analytics to identify potential donors, thereby personalizing engagement strategies to optimize fundraising endeavors.

**Figure 3: Impacts of AI Adoption Across Various Domains**



### **Outcomes of the Implementation of AI**

AI integration in Indian higher education brings notable successes, enhancing student achievements, streamlining administration, boosting research, and promising ongoing advancements. A few illustrations are provided in Table 1.

### **Potential Societal and Economic Impacts**

AI integration in higher education holds vast societal and economic potential, offering universally accessible, high-quality education to bridge educational gaps and broaden opportunities. AI's adeptness in customizing content for diverse learning styles enhances outcomes and boosts engagement, benefiting a broad range of learners. Furthermore, AI's role in the provision of micro-credentials and condensed courses offers a gateway to lifelong learning, enabling the continual acquisition of fresh skills and knowledge throughout one's professional journey. In a dynamic job market, the agility of skill development is crucial. AI fosters global collaboration, creating a diverse learning community and promoting cultural understanding. AI also enhances inclusivity with tailored accessibility features for differently-abled individuals, making education more egalitarian. Moreover, AI expedites research across disciplines, leading to breakthroughs in medicine, science, and technology. Integrating AI in curricula equips students with essential skills for emerging sectors, fostering awareness of AI ethics, responsible application, and addressing algorithmic bias in navigating the AI landscape responsibly and equitably.

Graduates equipped with AI-related skills emerge as highly prepared candidates for the dynamic contemporary job market, particularly excelling in technology-centric sectors. This enhanced skill set significantly boosts the employability of the entire workforce. The integration of AI into higher education aligns educational offerings with the evolving demands of the job market, empowering institutions to tailor courses to industry needs. This strategic alignment not only enhances operational efficiency but also reduces administrative costs, allowing institutions to allocate resources judiciously. AI-competent graduates, known for their entrepreneurial spirit, drive economic expansion through new ventures and technological innovations, fostering overall economic growth. AI-infused online education platforms attract international students, diversifying the global talent pool and strengthening economic vitality. The automation capabilities of AI-driven systems in grading, administration, and resource allocation generate cost savings, which can be reinvested in educational programmes. The incorporation of AI in higher education catalyzes job creation and economic progress in the education technology sector while fueling ongoing research and development in AI technologies, leading to groundbreaking innovations with broad economic applications. While the integration of AI in higher education holds significant promise, it brings forth challenges related to data privacy, ethics, and regulatory frameworks. It is imperative for educational institutions, policymakers, and stakeholders to collectively tackle these challenges, ensuring that the adoption of AI positively contributes to both societal and economic well-being.

## **Discussion**

AI assumes a crucial role in the transformation of blended learning, molding it across various dimensions. It introduces a paradigm characterized by personalization, adaptability, efficiency, and accessibility, exerting a profound influence on the landscape of education. By analyzing individual learning styles, AI personalizes learning experiences, ensuring tailored support. Adaptive learning platforms dynamically adjust course materials based on real-time student performance, promoting optimal challenge levels. Predicting potential issues through data analysis enables early interventions, enhancing student retention. AI automates administrative tasks, offers instant feedback, enriches virtual reality experiences, and fosters global collaboration. However, ethical considerations and challenges like data privacy require collaborative efforts to ensure positive outcomes in the AI-driven education landscape. Continued research and development (R&D) in AI-assisted higher education curriculums are pivotal for several reasons:

### **Keeping Pace with Advancements**

AI technology advances swiftly, with continuous research and development ensuring up-to-date curricula. Integration of innovative AI methods yields personalized content, interactive tools, and enhanced engagement and outcomes in education.

### ***Mitigating Ethical Concerns***

Continual research addresses AI's ethical concerns, and biases, promoting responsible use with fairness and transparency. Evolving skill demands in the job market are met through R&D aligning AI curricula, and enhancing graduate employability. AI's relevance spans academic disciplines, with research facilitating its integration.

### ***Fostering Innovation***

Research and development inspire inventive pedagogical methods and technologies, potentially fostering educational startups and inventive solutions. Countries and institutions investing in AI education and research gain a competitive edge in the global knowledge economy. AI-generated data and analytics have the potential to revolutionize educational decision-making. Research guides resource allocation, student support, and curriculum design. R&D cultivates a culture of continuous

improvement, enabling institutions to refine AI implementations based on feedback and evaluation. AI's societal implications are extensive, and AI-assisted curricula prepare students for ethical, social, and policy challenges related to AI.

## **Transforming Decision-Making through AI-Enhanced Blended Learning - Recommendations**

The integration of AI in education requires careful consideration of policies to ensure ethical, responsible, and equitable use of AI technologies. Here are some policy recommendations for AI integration in education:

### ***Higher Education Policy Level***

Implement stringent policies and regulations governing student data collection, storage, and sharing, aligning with data protection laws like GDPR or FERPA. Strengthen cybersecurity measures to safeguard sensitive educational data against breaches. Enforce ethical guidelines covering bias mitigation, fairness, transparency, and accountability in AI's educational deployment. Conduct routine ethical audits of AI systems in educational institutions. Prioritize designing AI-powered educational tools for accessibility, accommodating students with disabilities. Promote inclusive AI solutions considering diverse student requirements. Advocate transparency in AI algorithms and decision-making for comprehension by students and educators. Encourage the development of explainable AI models for clear explanations. Define data ownership rights explicitly, clarifying whether student-generated data belongs to the institution, the student, or both. Uphold informed student consent regarding data utilization in AI systems and research. Establish policies for ongoing teacher training in AI education. Enforce fairness policies in AI-driven assessments, subject to periodic evaluation. Formulate guidelines for identifying and mitigating bias in AI algorithms and datasets. Consider dedicated regulatory frameworks for AI in education. Institute mechanisms for continual monitoring of AI implementations in education. Champion research on ethical, societal, and pedagogical dimensions of AI in education. Advocate policies mitigating the digital divide to ensure accessibility. Foster collaborative initiatives for shared standards in AI integration. Solicit input from stakeholders in policymaking to align with educational community needs. Sustain periodic policy reviews to accommodate technological advancements.

These comprehensive policy recommendations aim to harness AI's potential in education responsibly, preserving students' and educators' rights, privacy, and well-being for favorable learning outcomes.

### **Faculty Level**

Significantly invest in educator training, providing essential AI competencies for seamless integration into pedagogical methodologies. Implement Universal Design for Learning (UDL) principles in the deployment of AI-driven tools, thereby guaranteeing adaptable learning experiences accommodating a variety of learning styles and capabilities. Assure accessibility of AI-powered content to all students, including those with disabilities, through the incorporation of features such as closed captioning and screen readers. Address the digital divide by supporting students with limited technology access, and providing offline resources. Foster transparent communication with students regarding AI technology advantages and integration. Encourage student participation, seeking feedback on AI tool interactions. Include discussions on AI ethics in the curriculum to promote critical thinking. Regularly monitor and assist students in AI-driven learning environments.

### **Higher Education Institute Level**

To ensure fair access to AI technologies, institutions should consider providing loaner devices or internet connectivity solutions to students facing limitations. Encourage diversity and inclusion initiatives to inspire underrepresented groups to explore AI-related fields. Foster a supportive learning environment by offering ongoing support and resources for faculty in effective AI integration. Promote a collaborative culture that facilitates knowledge exchange among educators. Establish robust data privacy and security protocols, communicating these policies effectively to stakeholders. Deploy mechanisms for reporting concerns associated with AI implementations and use feedback for iterative enhancements. Transparency in AI adoption goals is crucial, holding institutions and providers accountable for ethical use. Support research on AI's impact on student learning to inform adoption strategies. Provide accessibility resources for inclusive AI technologies. Engage with the broader education community to ensure inclusive AI adoption, aligning with equity and social responsibility principles for the benefit of all students.

### **Future Research and Explorations**

The realm of AI in higher education is dynamic, offering multiple avenues for future research. Exploration areas include AI-driven pedagogical models for enhanced personalized learning and adaptability. Novel AI-based assessment techniques beyond traditional exams, such as project-based assessments and automated essay grading, require investigation. The effectiveness of AI-driven interventions, including early warning systems and adaptive tutoring, merits thorough exploration. Strategies for inclusivity and accessibility in AI education, especially for students with disabilities, need attention. The exploration of AI's role in nurturing 21st-century skills and its integration into curriculum design is essential. Additionally, AI's potential to enhance faculty productivity, stimulate pedagogical innovation, and contribute to professional development needs in-depth investigation. Research on AI's role in various research activities, learning analytics methodologies, and its convergence with emerging educational technologies holds promise. Scrutinizing AI's role in safeguarding educational quality, program accreditation, and application in specialized fields is crucial. As AI evolves, research in these domains contributes to effective, ethical, and inclusive AI solutions for higher education.

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**Editor**

# Impressions of Technology on Human Relationships

Parul Mishra\*

Technology is a broader term and plays an important role in every field in today's world. It may not be wrong to say that technology has affected all the shares of human life. Education and social life do come under this share. The cultural norms and behaviour of individuals are changed to the new normal. Current communication technology such as mobile phones, the internet, and inventions such as social media platforms Facebook, Skype, and Twitter have affected human interactions and relationships adversely. Actually, social media and networking technologies create a level of loneliness among people. Most of the population of the world uses mobile for communication and various other reasons. Moreover, technology has abetted humans in so many conducts by making everything easier. Despite some benefits, it also has some issues as this advancement in technology has seriously affected our lives and how we communicate with each other. The use of mobile phones especially by the young generation has developed various symptoms of behavioural addiction and besides this more usage of cell phones is interrupting their day-to-day activities as they are totally dependent on phones for their work. The study will attempt to prove that the long-time given to mobiles has had a negative impact on human relationships. The use of mobile has now become an everyday thing which will at a certain point in time be dangerous for the mental growth of humans. Excess use of technology such as mobile and the internet has a negative and adverse impact on both the quantity and quality of face-to-face communication.

Communication is an integral part of society. Without communication, it becomes impossible to do any kind of work in this society. If we talk particularly about early communication methods it includes a disorganized collection of making sounds, drawing in stones, imperial communication, pigeon post, etc. (Gascoigne, 2019). However, humans reached a new milestone in communication after the invention of the first practical telephone by Alexander Graham Bell in 1876 (Biography, 2018). After a few years, mobiles took the place of telephones and were developed in the 1940s by engineers of AT&T (Switch, 2020). Mobile technologies are undergoing frequent changes leading to the development of the field. The growth is inclusive of all sorts of technical and virtual communications.

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Furthermore, front-runners of mobile technologies like mobile device companies and related app developers strive to fascinate the progressively growing wide section of mobile users to realize their conditions. A smartphone is smart enough to make calls, send e-mails, watch and share photos and videos, play video games and music, keep track of appointments and contacts, surf the Internet, use voice search, check news and weather, use chat applications for voice calls and texting like WhatsApp and interact on various social networks like Facebook, Instagram, etc. The initiation of cyberspace was one of the most important spaces given in the phase of the development of communication technologies. Moreover, the internet played a critical part in dropping the cost of communication and promoting efficiency within various communication channels. Before the advent of the internet, it was hard to communicate which was a drawback in the growth of the nation. Communication before the Internet was costly and time-consuming especially when people were in geographical locations. There are many other factors that were affected by the lack of smooth and uninterrupted communication. Due to the high cost of communication, it was very difficult to maintain meaningful relations between people so in short, the implementation of internet technologies brought the world closer and together (Steinfeld, Ellison, and Lampe, 2008). Now people can communicate at low costs despite of the physical distance between them. The internet and internet-based communication channels have improved the quality of human interactions and also of relationships.

Nowadays, smartphones have engulfed all the strata of society. The use of smartphones is no more known as unusual. However, these smartphones can do more than just communicate in a short span of time. Talking about the work done in this modern era, there is hardly anything that cannot be done by smartphones. However, all the features come with a cost; their impact on social behaviour and human affairs is striking. In the contemporary era, the public is so dedicated towards mobile technology that a massive downfall in the intensity of relationships has been observed. Traditional human interaction is purely at stake because of this smooth communication. Due to innovative techniques features such as Instant messages and phone calls have become so available that humans have lost interest in face-to-face communication. A survey done on 120 senior students of Al-Azhar University revealed that

mobile technology has dramatically reduced the face-to-face communication of subjects with their close people (Elsobeihi & Naser, 2017). The reason behind this is that these students have become more reliant on mobile technology as it offers communication with many more diverse people with different backgrounds (Elsobeihi & Naser, 2017). It is a matter of debate that individuals are using this technology more for surfing social media sites for entertainment than for their academic/work purpose. Around 87% of people use their phones for 2 to 8 hours daily and a possible reason for this addiction was the era of the COVID-19 pandemic. During the pandemic people started using phones for their work, however, it is noted that more than 8 hours of use of these sites and online work is harmful to the mental health of an individual. It is noticeable that individuals are giving more importance to their reel life compared to their real life. Nonetheless, it has been observed that the online time of an individual has increased significantly with the development of mobile technology and around 98% of the world in the age group 11 to 30 are more addicted to this technology. It is a signal to the coming generations that the consequences of the growing mobile technology on social behaviour and human relationships tend to be adverse. Regular usage of mobile phones is showing several serious effects on the mental health of people and one among them is Nomophobia, a kind of fear that an individual feels during the absence of mobile phones and results in a disturbance of his psychological conditions. The kind of inclination society has today for smooth communication, in the name of growth, will undoubtedly result in many disorders; fewer people will be inclined to communicate with a person in the traditional method. The rapid advancement of electronic media and technology with various features such as messaging, calls and other documentation work has made it quick and easier. The growth, no doubt, is helping the industry and academia to grow, however, with the growth of mental diseases among the users. It is squeezing out the real essence of what is called human, the man-made machines are controlling the God-made Man.

Since mobile technology is rapidly evolving, and it is expected that this will continue for the unforeseeable future, it is therefore certain that these adverse effects will become much more severe in the future times. The charm of face-to-face communication does not exist anymore, and the time spent with family is also very short compared to online social life. In addition to this, when it comes to talking about human relationships mobile technology

has an insignificant contribution to the connectivity maintenance of human relationships. Overall, mobile technology is harmful to a certain extent. One must have a balanced aptitude to handle both, technology and men.

The current society is swift in adopting every change offered to it by communication technology. Mobile phones are a boon of this century. The mobile phone has become an important part of society. Keeping mobile is no more a luxury it has become a necessity in the COVID times. It is not only limited to being known as a communication ruse but also a necessary social accessory. In comparison to fixed telephones, the number of users of mobile phones has increased as it is portable and easy to carry, unlike the traditional heavy boxes. Therefore, it cannot be wrong to say that mobile phones nowadays have become no less important than their own life. In fact, for a successful life, it is essential ownership. Recent research quotes that around 4.5 billion people are using smartphones across the world. A large number of surveys have been conducted on the youth worldwide which shows that for the young generation cell phones are more important than food for them. With several features such as texting, calling, listening to music, playing phone games, and much more, the phone has become an integral part of their lifestyles, and without it, they may face several symptoms related to paranoia. The Telecom Regulatory Authority of India shared the update that there are around 929.37 million mobile phone users in India, making the nation the world's second-largest cell phone-using developing country. Mobile phones such as Motorola, Nokia, Samsung, Sony Ericsson, etc. are the popular brands that have their hold in the Indian market by introducing the latest mobile phones at regular intervals. There has been quite an enormous amount of popularity of cellular phones in the younger generation within a short span of time (Hakoama & Hakoyama, 2011). Youth is more inclined towards using mobile phones for activities other than communication than the older generation (Mackay & Weidlich, 2007) because, in the adolescence stage, people are more susceptible to changing fashion trends and styles, building them more tech-savvy which creates certain behavioral disorders. On the contrary, administrators and teachers frequently consider the use of cell phones by students at schools, restraining them from their education and this arises as hurdles in their education (Johnson & Kritsonis, 2007). Moreover, mobile phones have aided in smoothening the progress of the social release of youngsters from parental authority (Ling, 2004). Due to more use of mobile phones on a

constant basis, it results in various physiological health hazards such as headaches, fatigue, and other health-related symptoms. The usage of mobile phones is causing many defects in society. It is one of the causes that are responsible for accidents; driving is one of the major causes of accidents, and some controversy still exists in the usage of mobile phones whether it is capable of producing tumors or not. People who use mobile phones for more than 8 hours on a daily basis show several symptoms that affect their psychological level. They do not show any strange corporeal and mental indications because of which their ailment goes unobserved by others. Current research shows that usage of online communication platforms will expand up to 50-60% over the upcoming four to five years. This expansion will be important in ensuring that people will communicate more efficiently and enjoy the benefits of the platform of Internet communication. However, the major problem is internet addiction and breakdown in interpersonal communications which result in higher levels of loneliness in societies (Parasuraman, Sheridan, and Wickens,2010) .

There are a lot of advantages of technology in the human workplace such as people can use various communication tools to interact or exchange information at work. A large number of people are using various business technologies to change the way their employees communicate and interact in the workplace. People from all over the world are using various communication tools such as text messages or video conferencing on Skype, WhatsApp, Telegram, Zoom, Google Meet, and Webex, to name a few to share and exchange information with each other. These virtual communication tools are helpful in sharing screens as well which helps in project-making and group decision-making. Besides all communication technologies can be used in every field. In short communication technologies help to improve communication. People can also use internet technologies to innovate ways of promoting anything online. It enables improved communication. people can use different business technologies to create business innovative ideas for growth and expansion. A wide range of technological challenges was created, and people were rewarded who came up with inventive concepts using technology. Moreover, people can use internet technology to develop new ways of promoting anything online whether it's industry or academics. Various platforms can be used by people of one organization to socialize and be creative with other people from a different organization. this later results in brainstorming and in short it encourages innovation and creativity. Due

to the use of technology, various works can be done with greater efficiency leading increase in production in a short span of time. The use of computers has less chance of errors. Due to the use of internal networks at the workplace, people don't have to move to different departments which saves a lot of time. The large use of the internet and computers has saved time and space as now people from any location can work from anywhere. Technological tools like virtual meetings save time as they don't need to be present physically and data will be shared online. Despite the advantages, there are also some disadvantages of technology in the human workplace such as distraction. The advanced use of social networking sites at the workplace when not required perhaps causes distraction and hence can affect the productivity of the employees. For ceasing this habit many organizations have blocked access to specific websites such as Facebook, Twitter, and YouTube so that there remains no space for distractions. Other technologies which cause distraction in the workplace are smartphones, computers, etc. The technology involves a high cost to buy and also to maintain. Many organizations cannot afford full-time specialists, so they hire monthly contractors for work done. If technology tools in the organization are not maintained properly such as computers, then it will result in decreased production, and buying them new results in high costs. Most of the work in organizations is performed by technology and as a result, people become lazy at work. Technology on the other hand kills skills and creativity on a large scale. Simple tasks related to daily life such as calculations are done by technology hence the brain of the people remains unused. People in the organization communicate via phone, text messages, or Gmail, which results in the elimination of face-to-face communication which is important for building workplace relationships. Despite the advantages that come with technology it sometimes appears to be risky especially in the case of data security as all people in the organization have access to private information which can be a big threat. The people in the organization mostly come with flash drives so there is a risk that they can transfer data from the computer and can take benefit from their personal gains. There are a large number of resolutions to reinstate humanity and to launch stability between social usage of technology and the existing interaction that one needs to have with each other as it is important to focus on what happened to our traditional social interaction as technology emerged, developed, and grew; it is perceptible that people used to spend more time together and human relations were strong before the involvement of technology. A trial should be given to attend, conduct,

and inspire gatherings such as meetings, conversations, and dinners where people meet and reach one another to share experiences, resources, and ideas. These intellectual and entertaining gatherings can help mold the youth of today accordingly. Irrespective of the technology-based industry and academics one should not avoid friendly facial expressions, understanding, politeness, and respect among human beings regardless of their age, nationality, colour, the language they speak, religious beliefs, or points of view. Efforts should be made to organise presentations about amity, conversations, and social interactions among human beings. Writing articles and booklets on these subjects can also prove to be an intellectual effort by the people. These articles can be for publication in newspapers and magazines anywhere in the world. This shall help people understand the value of traditional communication. Moreover, it would help disseminate relevant information such as brochures and maps in neighborhoods, universities, etc, or in the city to reassure individuals to get an idea of their environment and contribute to interesting and exciting events.

## Conclusion

Hence, it can be summed up that mobile technology has both negative and positive effects on social behaviour and dealings. The impression is typically traced in the adolescent to adult age range, and the rapid progression of mobile technology has instigated a huge increase in its convention. As a consequence, people prefer giving more importance to their online social life than real social life. It is commonly known to all that frequent use of mobile phones causes Nomophobia without knowing the slightest idea about it, as a result, their emotional intelligence suffers, and face severe deteriorations related to body and mind. In addition to all this, people seem to believe that mobile phones help them preserve their relationships. On the contrary, it is observed that mobile phones may help keep close-range connectivity. Additionally, it does help with long-distance relationships. However, a healthy recommendation is to reduce the extent of these adverse effects. The routine recommended will consist of assigned hours for different activities, and the activity with the most urgency will be on priority of the number of hours. The pace at which technology has taken to leap indicates a signal of the future. The problems persisting will no longer exist in the future. Hence, people should be updated and upgraded carefully with the use of technology in their social lives. It is accepted by society and its people that people will avoid connecting face-to-face with each other rather they will prefer to connect via technology.

It is partly because they spend more time on their mobile and internet and therefore have little time and interest for interaction with their friends and family, perhaps because the internet offers them the platform for personal interactions with many people of diverse backgrounds around the world. The current analysis of the research in the related field claims that more than 78 % of students observed a dereliction in the quality of their conversation with others when technology is present or applied. This indicated strongly that face-to-face communication is on the verge of extinction. If necessary, measures will not be taken and executed twenty-first century is going to be witness to an end of the convention.

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# Artificial Intelligence in Education: Retrospect and Prospect

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Artificial Intelligence (AI) has transformed the way we live, think, and work. We consider it the fourth industrial revolution due to its tremendous potential. However, along with its spectrum of opportunities, it also comes with unfathomable challenges (Srivastava, 2018). AI is getting a lot of attention because it can understand how humans think and do tasks that need human intelligence. The word artificial intelligence was first used at a workshop in 1956 at Dartmouth College (McCarthy et al., 2006). Zhong (2006) defined AI as “a branch of modern science and technology aiming at the exploration of the secrets of human intelligence on one hand and the transplantation of human intelligence into machines as much as possible, on the other hand, so that machines could perform the function as intelligently as they can”. The main question about AI is, how can a program do things that are similar to human intelligence? Turing (1950) in his paper “computing machinery and intelligence” raised some philosophical Questions like “can machine think”, which subsequently established the fundamental goal and vision of artificial intelligence. The general conception of AI is a supercomputer that can perform “human-like tasks” and has “Human-like cognition” (Timms, 2016). It is, however, not a single term but an umbrella term for any kind of software or hardware that aims to make machines intelligent. It challenges the very process of human thinking and tries to excel in it. AI in the 21st century encompasses almost every aspect of human lives including agriculture, education, medicines, science and research, marketing, law, cyber security, power station forensic science, manufacturing, exportation, data accumulation, analysis, and dissemination (Jindal et al., 2021). The globe is now governed by AI and countries are adopting policies to come on par with the new change. Countries are creating their own plans for Artificial Intelligence alongside their national policies. UNESCO’s sustainable development goals in 2021 have brought significant

attention to the transformative potential of AI in different sectors. The Indian government, through the adoption of NITI Aayog, has made great progress in using AI for development in areas such as Education, Agriculture, Healthcare, Manufacturing, law, and security. It stresses the seven principles of safety and reliability, inclusivity and non-discrimination, equality, privacy and security, transparency, accountability and protection, and re-enforcement of positive human values (NITI Aayog, 2022).

The Indian government has launched multiple initiatives like USIAI India and YUVAI to integrate AI into different sectors. NEP 2020 and NCFSE 2023 focus on integrating Artificial Intelligence into different subjects to foster an AI mindset among school students (Chaurasia, 2023). Artificial intelligence gives machines the ability to think analytically and do the work of a hundred hands untiringly. In education, AI can be seen doing the basic task of grading, personalized and adaptive teaching. It can be helpful in activating teaching by narrowing the gap between teacher and learner (Verma,2018). Deep learning, Machine learning, Natural language processing, expert tutoring systems, and Virtual classes could be seen to have almost classroom effects on the students (Jindal et al., 2021). The greatest achievement of AI in this sector is the reduction of biases with education reaching every nook and corner of the world and attaining the UNESCO, 2021 Sustainable Development Goals of inclusive and equitable quality education.

The fear that artificial intelligence might supersede human intelligence has led researchers to explore and understand the concept of artificial intelligence and the philosophy behind it.

## History of Artificial Intelligence

Human-like artifacts have been depicted in history since time immemorial. Around 850 B.C., we find references to Homer who talks about poor old ugly Hephaestus, the god of fire and the divine smith, who, because he is crippled, has to fashion attendants to help him walk and assist him in his daily task (McCorduck, 1977; Delamater, 2018; Mohan,1995;

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Buchanan, 2006). We have recognized the Greeks for developing the *Antikyetha* mechanism, which is a wheelwork simulating heavens, however much ahead of the Greeks the Vedic history raised profound questions on existence and knowledge and developed certain theories on intelligence (Honaver, 2016). In 1956 John McCarthy (Dartmouth College), Marvin L. Minsky (MIT), Nathaniel Rochester (IBM), and Claude Shannon (Bell Laboratories) conducted the Dartmouth Summer Research Project on Artificial Intelligence and used the term to delineate machines that could simulate human intelligence. These veterans for the first time proposed that intelligent human behaviour could be reproduced and construed in a machine (McCarthy et al., 1955).

The years that followed saw the evolution of computer and information and communication technologies leading to the development of artificial intelligence. Artificial intelligence, according to Coppin (2004) is the ability of machines to adjust to new situations, solve impending problems, handle emerging situations with ease, devise various plans, answer questions, and perform various other functions that otherwise are done by human beings (Coppin, 2004). AI understands the nature and thought of intelligent action and acts according to the demands of the situation.

### **Artificial Intelligence in Education**

Artificial intelligence has been highly valued as having vital potential for taking education to a different level (Sheldon & Abidoye, 2018). Loeckx (2016) suggested that AI could lessen the burden of teaching and learning by serving as an effective teaching tool for teachers and by offering constructive learning experiences to students. The introduction of gamification, the development of reactive and adaptive tutorials, and the intelligent tutoring system (ITS) according to Boulay (2016) would bring the desired digitalization in education. AI enhances individualized learning by monitoring students' input, giving instant feedback, assigning appropriate tasks, and providing a platform for human-computer communication (Sheldon & Abidoye, 2018, Chen et al, 2020). Richter et al. (2019) talked of four areas where AI can be applied in education: i. profiling and prediction, ii. assessment and evaluation, iii. adaptive systems and personalization, and vi. intelligent tutoring systems. Apart from academic support, AI can also be used for institutional and

administrative purposes. At the administrative level, AI has taken charge of almost everything like admission, assessment, counseling, library services, etc (Ahmed at al., 2021). Students' enrolment, processing and handling of admission applications, filtering suitable students, keeping their records, and helping the students in acquiring jobs are all done by AI in a systematic and easy way (Karam at al., 2017) IBM supercomputer Watson is an example of how AI is transforming the very nature and structure of administrative job (Popenici, 2017). Data analytics in Education Management Information Systems (EMIS) is a large-scale administrative process where data from different school students are collected and kept in records to improve a state's capacity to manage large-scale educational systems (UNESCO, 2019).

Chen et al. (2020) gave several major AI applications in education, such as intelligent tutoring systems for special education, natural language processing for language education, educational robots for AI education, educational data mining for performance prediction, discourse analysis in computer-supported collaborative learning, neural networks for teaching evaluation, affective computing for learner emotion detection, and recommender systems for personalization. Similarly, Baker (2000) talked of three different AI models and their role in education and educational research. Firstly, models as scientific tools, that are used for understanding and predicting different aspects of educational situations. Secondly, models as components of education that are used for the teaching and learning process, and third, models as a basis for designing where computer tools are designed for educational purposes.

### **Artificial Intelligence and Barriers to its Applications**

Artificial intelligence and its applications have four barriers: Cultural constraints, fear, lack of skills and lack of strategic planning (Tariq et al., 2021). Cultural Constraints are the constraints that are related to the human nature of intransigence to change. This intransigence comes from the habit patterns that humans follow. They are reluctant to any kind of change until and unless they are convinced that the new change would be beneficial and profitable (Tarafdar et al., 2019). Resistance also comes because of the inability to manage

control over new things and the changed atmosphere (Makridakis, 2017). The intransigence also occurs mainly because of insufficient knowledge of AI and its benefits (Yigitcanlar et al., 2020). Education, however, can help people understand the benefits of AI, its productivity, and its cost-saving propensity (Fontaine et al., 2019).

Fear is a natural phenomenon and a strong emotional setback of humans since time immemorial. Humans have yet to fathom the depth of AI and the enormous change it would bring to their lives due to the fear attached to AI (Tariq et al., 2021). Fear can be receded by understanding the benefits of AI, the complimentary and productive nature of AI to human advancement has to be given weightage (Mata et al., 2018). The fear of unemployment could be removed by making both humans and machines work together side by side instead of one replacing the other (Ploder, 2019).

Lack of skills is a crucial issue when it comes to the implementation of artificial intelligence and other database technology. Lack of skill and specialization in technologies stand as a barrier to organizational growth and individual performance. Even though artificial intelligence has been used for several years now, much more is yet to be known and explored (Lee et al., 2018). Skills and specialization in technology demand higher salaries and promotional positions as firms require artificial intelligence for organizational growth and are willing to invest in AI (Moulin-Frier et al., 2017). There is fierce competition among companies to hire new talent and there is every possibility that this competition will close the gap between demand and supply and thus society might overcome this barrier of lack of skill (Jarrahi, 2018).

Lack of Strategic Planning for Artificial Intelligence is a mix of a few different obstructions viz. shortage of skills, cultural barriers, difficulty in management to understand the benefits and productivity of artificial intelligence and technological transformation” (Tariq et al., 2021). The outcome of the various developmental programs of artificial intelligence lacks in strategic planning and hence cannot address organizational benefits and the overall progress of the organization. The main reason behind this is the lack of awareness of the organization in understanding the significance of AI, its goals and objectives, its various characteristics,

its data collection and accumulation strategies, and its various other insights (Nguyen et al., 2019). The solution to this barrier is a clear understanding of the prospects and advantages of AI and a complete knowledge of its excellence. The success and failure of firms thus would depend on the strategic planning of how to utilize AI for gaining their objectives (Olsen & Tomlin, 2020; Raj et al., 2020).

### **Artificial Intelligence and its Connotations in Education**

The connotations of artificial intelligence in education can be viewed in two different aspects, subjectivity and auxiliary (Matthew & Abigail, 2015). In the subjectivity aspect, AI can be a school companion, a tutor, a student, and an assistant. In the objectivity application, AI can be a teaching aid, resource, circumstance, and learning tool. Artificial Intelligence in Education (AIEd) is mainly concerned with the development of computers that perform cognitive tasks, usually associated with human minds, particularly learning and problem-solving (Baker & Smith, 2019). Intelligent robots and adaptive learning systems are used both in K-12 and university contexts to provide opportunities for personalized learning for learners to suit learners’ needs and aspirations (Ventura, 2017).

AI technologies not only provide the learners with individual learning space and experience but also offer opportunities to instructors to hand over their repetitive and tedious tasks to AI teaching assistants, giving them ample time and scope to focus on students’ queries and augment learning (Chan & Zary, 2019; Luckin, 2021). AI has the potential of globalizing classrooms, it can move beyond the boundaries of time, space, and language and can provide experiential learning to one and all. AI is used to teaching almost all subjects from mathematics education to natural sciences, from language education to social sciences, and from computer education to music education. AI also plays a major role in higher education; we have introduced it in medical education to augment clinical practice. It assures quick and accurate diagnosis, reduces errors, and cuts off repetitive tasks. AI applications like speech recognition, face recognition, chatbots, and content creation form an important part of Marketing Education. Branches of AI like Deep Learning, Machine learning, Neural networks, computer vision, Natural language processing, etc form an important

part of engineering education (Mathew et al., 2022). The benefits of AI in education range from providing equality to inclusivity, competitiveness to efficiency, from better engagement to better cost reduction, and from virtual mentors to automation. AI also plays an important role in administration and evaluation. It simplifies the administrative tasks of enrolment, recruitment, assessment, and grading (Ahmed et al., 2021).

### Using Artificial Intelligence: The Road Ahead

Artificial intelligence has been found to have tremendous advantages, one of the most significant benefits has been in the health sector as it has increased the level of performance of physicians and has improved the life quality of the patients (Nadimpalli, 2017; Eugene, et al., 2014). Artificial intelligence also has a lot of importance in business, through the proper installation of computers companies utilize the logistics for shipping their cargo to distant places (Modgil & Prakken, 2013). The finance and banking industry also makes use of artificial intelligence to ensure that illegal acts like fraud and malpractices do not take place in the finance sectors (Copeland, 1993). The most recent innovation of AI towards protecting human lives have been in the mining sectors, where human lives are put at risk for extraction purpose, but now some mining companies use artificial intelligence as human assistants to attain desirable outcomes and protect the precious lives of individuals who regularly work in the mining industry (Hovy et al., 2013). Although Artificial intelligence has been applied in almost every aspect of human lives there are many far-reaching negative connotations associated with it like “AI is only as good as the data put into it, if the input data is misleading the outcome might be misleading too leading to serious issues” (Michalski et al., 2013).

Another risk of artificial intelligence is that by reducing or replacing human subjects the companies not only intimidate the process of unemployment but also push backward economic development as human skills have a better prospect of employability (Modgil & Prakken, 2013)

Boutilier et al. suggest that AI has the potential to replace human intelligence as humans rely excessively on AI, the idea that the human brain or human knowledge is insufficient and that it could be

better replaced by an AI is a dangerous thought that is occupying the human brain and is giving a negative impact. One more misconception regarding AI is that it reduces the general level of human emotions. Too much involvement in machines could sway humans away from real emotions almost converting them into machines (Hovy et al., 2013).

### Conclusion

AI has entered human lives in a variety of ways from switching off the alarm clock in the morning to switching on the lights at night, humans are engulfed by AI, however, there is very little understanding among the public regarding the workings and implications of Artificial Intelligence. The major discussion tries to articulate the different aspects of Artificial intelligence from reflecting on the past, directing the present and shaping the future and exploring how it has touched human lives. The three major domains upon which human existence depends are agriculture, education, and health care have undergone tremendous change due to AI. It has opened the prospect of job and job opportunities and has taken society into the process of growth. Artificial intelligence seems promising in making a strong intervention in the various aspects of education. The discussion that leads the hour is whether AI can be a support and tool or can be the major driving force in education. Many researchers are pointing to the need and participation of AI in education but concerns also arise regarding this. Therefore, in this technological era where the world has become one global village where distance and isolation no longer exist, the prospect of AI is no doubt significant. Nevertheless, it should be kept in mind that it might supersede humans and, therefore, it needs to be utilised with the conviction that it is ultimately a machine that is run by human intelligence.

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# Exploring the Concept of Artificial Intelligence in Education

Aman Singh\*

Apart from Zoom Meetings and the COVID-19 pandemic, another term “Artificial Intelligence” is very much in vogue in print and visual media these days. The COVID-19 pandemic influenced the economic, social, and political world order in many ways. New advanced innovative technologies like artificial intelligence, big data analytics, data mining, deep learning, and machine learning are extensively used ranging from defence sector to finance to health. The introduction of artificial intelligence has started a new discourse about job losses in the manufacturing and services sector. The use of artificial intelligence in education has transformed the traditional meaning of education imparted through the classroom. The integration of artificial intelligence in teaching-learning methodology will bring changes in the traditional approach to education. A universal definition of artificial intelligence is not possible due to its interdisciplinary nature. Anthropologists, biologists, computer experts, neuroscientists, and psychologists each contribute to the development of artificial intelligence. Each of these experts has their own perspective. Artificial intelligence can be used as a personalized tutoring system, virtual learning assistants, smart search engines, quick learning systems, smart learning kits, and study materials. Artificial intelligence and analytics also help make quick decisions in forming education policies. With the help of artificial intelligence and analytics, data evaluation and data analysis become easy. This also helps in the quick implementation of policies related to education. With the introduction of artificial intelligence, the personalized data of students, faculties, schools, colleges, and universities can be managed efficiently and securely. In this paper, there will be a discussion about the meaning of artificial intelligence and analytics, the uses of artificial intelligence in education, and the challenges of artificial intelligence.

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## Concept of Artificial Intelligence

There are several definitions of artificial intelligence on Google that have surfaced in recent times. Before the formal definition of artificial intelligence came into existence, Alan Turing’s formal work, “Computing Machinery and Intelligence,” was published in 1950. In this paper Turing raises the question, “Can machines think?”. A few years later, Stuart Russell and Peter Norvis published the paper ‘Artificial Intelligence: A Modern Approach’. In this paper published by Stuart Russell and Peter Norvis, there are four elements for the definition of artificial intelligence (Machines, n.d.). The four elements are:

### *Human Approach*

- Systems that think like humans.
- Systems that act like humans.

### *Ideal Approach*

- Systems that think rationally.
- Systems that act rationally.

According to McKinsey, artificial intelligence is a machine’s ability to perform the cognitive functions we associate with human minds such as perceiving, reasoning, learning, interacting with an external environment, problem-solving and even exercising creativity designing. A very good example is voice assistants like Siri and Alexa which work on artificial intelligence technology principles, and customer service chatbots that pop up in website navigation work technology (McKinsey, 2023).

According to the European Parliament, artificial intelligence is the ability of a machine to display human-like capabilities like reasoning, learning, planning, and creativity (Parliament, 2023). Artificial intelligence works in every field of human life from smart washing machines to agriculture farms. The use of artificial intelligence in our daily lives is shown in Figure 1.

Artificial Intelligence refers to the simulation or approximation of human intelligence in machines. The goal of artificial intelligence is computer-enabled

learning technologies, reasoning, and perception. The application of artificial intelligence is endless, and it is an evolving technology, every time adding new features. There is a common perception that when we hear the term artificial intelligence, the first thing that comes to our mind is robots. This is because most big-budget movies show humans like machines attacking our planet Earth or taking control of computer servers to fulfil their mission. But in reality, artificial intelligence is not what is shown in movies or novels (Frankenfield, 2023).

The analysis of the above definitions informs that artificial intelligence is the use of computer technology to solve complex problems with zero errors, making human work easy with the help of machine learning, and big data analytics. The use of artificial intelligence is not only limited to education, but it can be used in diverse ways.

K. Ahmad. et al, uses the term artificial intelligence as an umbrella term i.e., it subsumes methods, algorithms, and systems that learn from data science, statistical learning, machine learning, and deep learning. The aim of artificial intelligence is to create machine intelligence that can do the tasks of perception, reasoning, and inference of data. The

artificial intelligence in education is broadly divided into two categories-

1. Representation / knowledge - based artificial intelligence
2. Data-driven artificial intelligence

The aim of knowledge-based artificial intelligence is to employ human expertise in the decision-making process, like a rule-based process. Earlier, knowledge-based artificial intelligence was more prevalent and commonly used. In the current scenario, data-driven and data-based artificial intelligence is more in use. Demand has shifted from knowledge-based artificial intelligence to data-based artificial intelligence techniques. Artificial intelligence in education has three key roles. These roles are (Ahmad, et al., 2023):

1. Assisting individual students
2. Assist the whole class
3. Assisting the whole group of students

At the individual level, the focus of artificial intelligence is on adopting teaching methods according to an individual's learning capability. An intelligent tutoring system was developed as a result of the need for individual-based learning methods. At the class

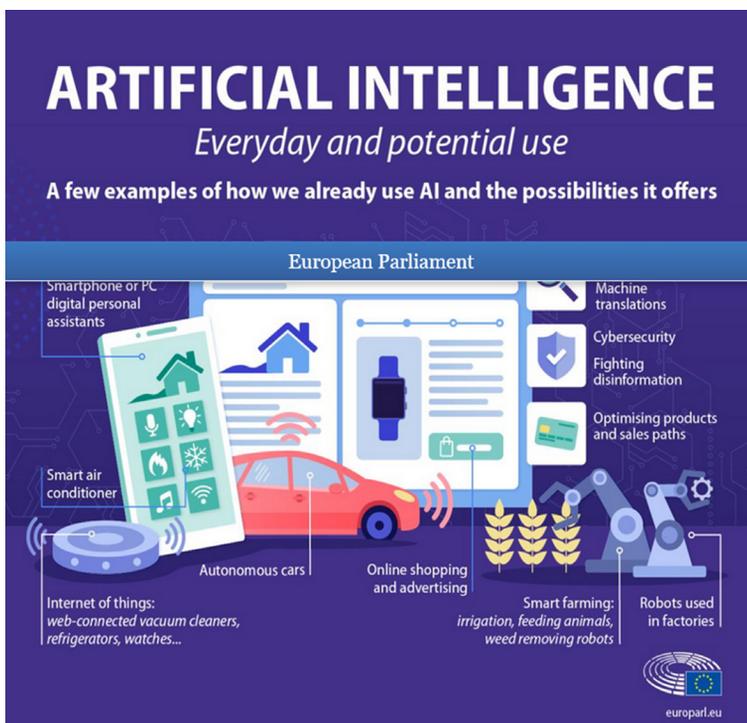
level, the aim of artificial intelligence is to assist the teacher in managing the whole class. Artificial intelligence techniques can be employed for class management. Teachers can use virtual reality learning-based methodology through the integration of artificial intelligence and teaching skills collaboration.

At the cohort level artificial intelligence application includes the identification of students' learning capacities, students' interest in learning and specific themes/topics, analysis of learner's behaviour, examination schedules, and dropout prediction. There is much research being conducted on artificial intelligence in education and how it can be utilized to solve educational problems.

### Artificial Intelligence in Education

After the COVID-19 pandemic, Artificial intelligence has transformed

**Figure 1 : Everyday Uses of AI in Daily Routine Lives**



Source: (Parliament, 2023)

human lives by integrating technology in daily routine lives. Apart from integrating artificial intelligence in other sectors, education is one of the significant fields that is affected most during the pandemic. COVID-19 has changed the meaning of the traditional form of education, relationships transformed between students and teachers, communication changed between teachers and students, and mode of learning was also affected.

According to Lynch, the introduction of artificial intelligence in education has given birth to debate on ethics in artificial intelligence in the technology community and beyond. Most universities and schools have developed a curriculum on ethics in Artificial intelligence. According to Lynch, Artificial intelligence can be integrated into education in five ways (Diego, n.d.)-

- i. Personalized guidance
- ii. Tutoring
- iii. Grading
- iv. Feedback on course content and quality of learning material
- v. Meaningful and immediate feedback to students

### **Artificial Intelligence for Improving the Learning Outcomes**

Artificial intelligence is changing the education landscape by providing a personalized learning experience to students. The use of technology has benefited the students by weakening the physical boundaries. Students can access the learning material in any language with the help of language translation tools. With new inventions upcoming regularly in artificial intelligence. College and university students benefit most from these new inventions. Artificial intelligence helps educational institutes to access analytic abilities. Due to this the teachers and educators get to know about the student's data and can analyze the student's strengths, weaknesses, and learning capabilities. The introduction of artificial intelligence has improved the learning outcomes in many ways. Some of these methods are (Ganesh, 2023)-

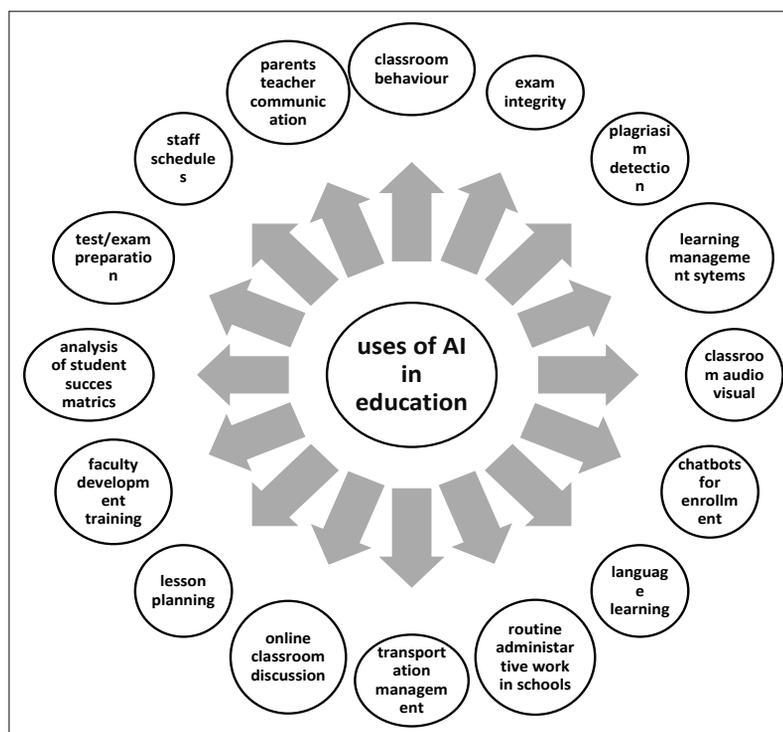
1. **Adaptive Learning:** Artificial Intelligence technology helps in teaching students basic and advanced skills by analysing their present learning

skills and creating instructions that help them to learn and become proficient.

2. **Assistive Learning:** Artificial intelligence helps physically disabled students and provides them access to more equitable learning. Artificial intelligence can read the chapters, and passages, to visually impaired children. The artificial intelligence can orally narrate the chapters thus strengthening the listening skills of learners.
3. **In Early Childhood Education:** Artificial Intelligence is currently being used to develop interactive games that help the children learn basic academic skills.
4. **Data and Learning Analytics:** Artificial Intelligence is extensively used by teachers and education administrators in analysing and interpreting data. This in turn helps in making quick decisions.
5. **Scheduling:** Artificial Intelligence helps administrators and teachers manage the teaching lesson plans, classroom schedules, and examination schedules on a weekly, monthly, or yearly basis.
6. **Facilities Management:** Artificial Intelligence helps in facilitating the management of services like electricity, water, internet, transportation, salary management of teaching and non-teaching staff, and other auxiliary services that are used in running the administration of schools and colleges. Artificial intelligence helps in alerting the school administration when there is a problem.
7. **Writing Skills:** Artificial Intelligence not only helps the students in learning skills but also assists in improving their writing skills. For example, Grammarly's computer application is used by students to correct grammar and spelling mistakes in their writeups.

Educational institutes in the era of digitization are adapting to the integration of technology in the higher education sector. The universities are introducing changes in the teaching pedagogy using algorithms, data mining, machine learning, and big data analysis. Universities and other educational institutes are spending finances on the upgradation of infrastructure (both civil and digital) to adopt the new technology in teaching and higher education. The uses of artificial intelligence are multiple in every field with a separate impact on each stakeholder. Figure 2 shows the uses of artificial intelligence in education.

**Figure 2: Uses of AI in Education**



Source: Compiled by Author

### **Impact of Artificial Intelligence on Higher Education**

Artificial intelligence affects the higher education in two ways primarily (Aldosari, 2020). Firstly, the use of Artificial intelligence in higher education has significantly affected the curriculum development. Artificial intelligence is characterized by speed, accuracy, cost-effectiveness, and minimum response time. Students need to be provided with training to know the usage of artificial intelligence and follow the ethics of artificial intelligence. The curriculum should be developed in a way that enhances their capabilities, helps in personality development, enhancing analysing power, learning, and writing skills, pro and cons of artificial intelligence need to be informed to students through the curriculum.

Secondly, with the introduction of artificial intelligence in higher education, a sharp drop in enrolment can be seen due to the high cost of higher education. Higher education is not easily affordable for all. The traditional language will be replaced by the digital language. The usage of digital language will help in accessing artificial intelligence in higher education.

There have been many previous studies on the impact of artificial intelligence in higher education. Artificial intelligence in higher education will replace the traditional methodology of teaching in universities with digital language and technology-integrated learning skills. Teaching methods will be developed in a new way which will enhance the students' skills to adopt this new form of digital language and technology in education. The use of artificial intelligence in higher education has started a debate about traditional universities v/s new universities. New university refers to the use of the digital medium for imparting education to students (Ocaña-Fernández, Valenzuela-Fernández, & Garro-Aburto, 2019).

In the white paper published by the Deloitte consultancy, the consultancy firm is of the opinion that

artificial intelligence can be used to transform higher education and provide opportunities for equitable access to education to all. Artificial intelligence will help universities boost revenue, increase students' satisfaction rates, and improve new teaching-learning methods. With the introduction of digital technology in teaching-learning methodology, there is an enormous volume and variety of data that is generated needs to be handled and analysed securely. Artificial intelligence can be efficiently used to handle and analyze data and solve complex problems. Analytics can be used to improve the student, faculty, and administrative experience. Artificial intelligence can help universities to develop innovative learning study materials according to students' capabilities. Artificial intelligence also helps in the faculty training development program. Training modules for faculties can be developed which help the teachers and academicians in their career development. Universities may partner with technological firms to provide guidance on current trends in using new technologies in education. Data governance is an important aspect of artificial intelligence. Lack of data governance and ineffective data management practice makes it difficult or impossible for education administrators to make informed decisions. Artificial

intelligence and analytics can be used in handling data governance (Anderson, Morgado, Sarkar, & Waljee).

Chen et al. studies about how the use of artificial intelligence in its different forms has impacted or affected different aspects of students' learning and teaching-learning methodologies in education. The study in this paper will help to assess how artificial intelligence has affected the administration and management areas of education. In his paper author explores technical aspects of artificial intelligence in education. Artificial intelligence-enabled education includes intelligent education, innovative virtual learning methodology, data analysis, and learner behaviour prediction and analysis (Chen, Chen, & Lin, 2020). Table 1 shows the role of artificial intelligence in education and major technologies that are supported by artificial intelligence.

**Table 1- Techniques for Scenarios of Artificial Intelligence Education**

Scenarios of Artificial Intelligence Education	Artificial Intelligence-related techniques
Assessment of students and schools	Adaptive learning methods and personalized learning approach, academics analytics
Grading and evaluation of papers and exams	Image recognition, computer vision, prediction system
Personalized intelligent teaching	Data mining or Bayesian knowledge interference, intelligent teaching systems, learning analytics
Smart school	Face recognition, speech recognition, virtual labs, A/R, V/R, hearing and sensing technologies
Online and mobile remote education	Edge computing, virtual personalized assistants, real-time analysis.

Source: (Rus, D'Mello, Hu, & Graesser, 2013)

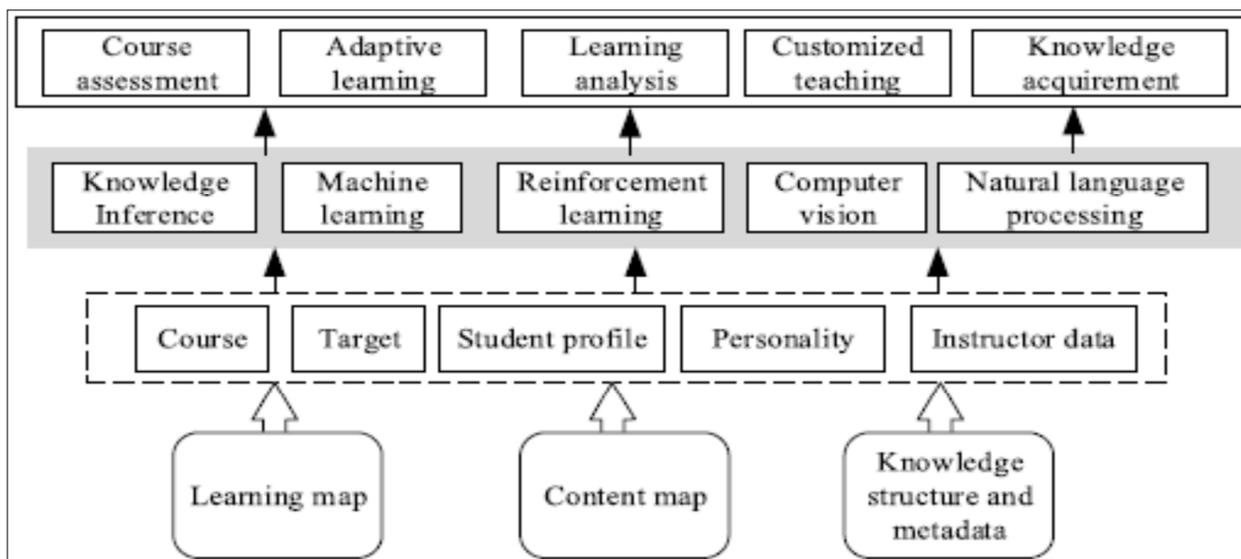
With the artificial intelligence enabled education system, artificial intelligence provides personalized instructions and feedback mechanism to both the students and teachers. The analysis of learning outcomes can be predicted through the artificial intelligence model and machine learning-related technologies. In an artificial intelligence-enabled education system, developing a model is crucial to help and improve learning. Artificial intelligence education system consists of teaching

materials, and data algorithms, which can be used to develop a model that acts as a guiding tool for educators and administrators. Developing a model works as a core in an artificial intelligence-enabled education system while the new inventions and advancements in technology provide the power to an artificial intelligence system (Kahraman, Sagioglu, & Colak, 2010).

In artificial intelligence learning system, machine learning, data analytics, and data mining are closely related technologies for education sector. Learning analytics emphasizes on data obtained from the student's profile, knowledge objects, the learner behaviour. The concept of analytics learning has introduced new technologies like machine learning. the purpose of this is to provide personalized education according to an individual's learning capabilities and personal requirements (Tsai & Gasevic, 2017).

Artificial intelligence-based learning can generate data and predict the students' competencies like which career the student pursues in school education. The application of artificial intelligence has been applied to educational institutes in different ways including automation of administrative tasks, examination process, curriculum and content designing, instructions to students, and students learning methodology. Artificial intelligence has also improved the working efficiency of the performance of the educational in states and universities, administrative tasks like evaluation, reviewing of student's projects, assignments, grading, and giving feedback on the student's writeups through web-based applications or computer programs. The application of artificial intelligence in education has also weakened national and international boundaries because learning material is now available on the World Wide Web in multiple languages. language barrier is diminished by the introduction of artificial intelligence in education. Language translation tools are widely used by students and faculties. There has been a gradual change in the technology in education. This transition was from computers to online internet-based technology to artificial intelligence-based activities in education. Artificial intelligence in education has transitioned from the computer to VLSI technology to embedded systems like co-bots or chatbots that function with the faculties and students (Chassignol, Khoroshavin, Klimova, & Bilyatdinova, 2018).

**Figure 3: Technological Structure of Artificial Intelligence in Education**



Source: (Deloitte)

Artificial intelligence in education does not only mean computers or internet-based applications or software, but it also includes other new innovative advanced technologies. The application of artificial intelligence in education brings together different technical professionals, systems designers, data scientists, linguistic experts, cognitive scientists, psychologists, and academic experts to develop artificial intelligence-based learning materials, instructions, and other web-based computer/mobile applications. Artificial intelligence in education is designed to perform more than just normal computer-related activities. The application of artificial intelligence has significantly affected the teaching of foreign languages specifically through artificial intelligence-powered tools in language education (Pokrivcakova, 2019).

Artificial intelligence is also used as interactive learning materials (ILEs), which are used to manage and give feedback and communication between teachers, students, schools, colleges, and universities. Another example of artificial intelligence in education is the development and use of intelligent tutoring systems like ACTIVE Math, MATHia, Why2Atlas, Comet, etc., which are used by academicians at different levels of education. Artificial intelligence in education has improved the quality of administrative processes, instructions, and learning. Another aspect of artificial intelligence in education is the use of virtual reality (VR) and three-dimensional representation technology (3D) in classroom teaching. 3D and AR enable the simulation and provide learners with an

opportunity for unique, experiential learning methods (Sharma, Kawachi, & Bozkurt, 2019).

Another application of artificial intelligence in education is the form of artificial intelligence in a web-based education system. Artificial intelligence in education is used as an Adaptive and Intelligent Web-Based Educational System (AIWBES). AIWBES is the integration of artificial intelligence principles and technology into web-based learning platforms. AIWBES aims to improve the learners' experiences, because it involves the learner's knowledge and skills, learning abilities, performance capabilities, teachers' teaching skills, and faculty development for using the latest technologies in education. Artificial intelligence helps to explore the and personalize the learning methodology according to his/her strengths and weakness (Brusilovsky & Peylo, 2003).

Artificial intelligence can be used in administration, instruction, and learning. Table 2 shows the various functions of artificial intelligence in different scenarios like education, instruction, and learning (Chen, Chen, & Lin, 2020).

There is an increasing recognition of the development of 21<sup>st</sup> century skills that are needed for the current and future work environments. These skills will be needed for the employment and personality development of learners. Artificial intelligence in education is used to develop these skills through curriculum development and personal guidance to students according to the learners' capabilities.

Artificial intelligence in education should help to track and monitor the learners progress regarding the skill development. Artificial intelligence in education should help in understanding the effective teaching approaches and the learning contexts that allow these skills to be developed (Luckin & Holmes, 2016).

**Challenges of Artificial Intelligence in Education**

The introduction of artificial intelligence in education has opened several opportunities for learners while on the other hand, artificial intelligence has raised questions and challenges about its usage in education. Artificial intelligence in education has raised challenges that need to be addressed for the responsible and ethical use of artificial intelligence. These challenges are ethical concerns and privacy issues.

A major challenge of artificial intelligence in education in general and specifically in higher education is violation of ethical values, norms and principles. Potential biases in artificial intelligence algorithms are a violation of ethics in artificial intelligence. Artificial intelligence algorithms are made on large datasets. Biases present in these datasets will give a biased result/output therefore affecting the fair use of technology in market. It is important to keep the artificial intelligence technology in education free from any internal and external biases (Roumate, 2023).

Decisions about data usage, transparency in data analysis, and system governance need to be carefully operated to ensure that artificial intelligence technology is used responsibly and securely. There should be clear policies and stringent laws and standard operating procedure to be framed for utilization of artificial intelligence by different stakeholders. While using artificial intelligence in education, if anything goes wrong accountability should be decided for its operation (Roumate, Ethics on AI and Technological Sovereignty, 2021).

Privacy is another important concern for the use of artificial intelligence in education. Artificial intelligence systems collect enormous data from schools, colleges, universities, students’ profiles, academic records, students’ behaviour analysis patterns. Artificial intelligence in education needs to address the privacy of students and the disposal of sensitive data. Artificial intelligence in education should be used safely, respecting the privacy of data and check the loopholes in data governance. students’ consent is important before storing the data in servers /Silos. Data breach and unauthorized access to data are important areas of concern for artificial intelligence in education (Kelly, 2021).

Other challenges of artificial intelligence in education are the adoption and acceptance of artificial

**Table 2: Functions of Artificial Intelligence Provided in Different Educational Scenarios**

	The work artificial intelligence can do in education
Administration	<ul style="list-style-type: none"> <li>➤ Perform administrative tasks faster that consume much of the instructor’s time, such as grading exams and providing feedback.</li> <li>➤ Identify the learning styles and preferences of each of their students, helping to build personalized learning plans.</li> <li>➤ Assist instructors in decision support and data-driven work.</li> <li>➤ Give feedback and work with students timely and direct.</li> </ul>
Instruction	<ul style="list-style-type: none"> <li>➤ Anticipate how well a student exceeds expectations in projects and exercises and the odds of dropping out of school.</li> <li>➤ Analyse the syllabus and course material to propose customized content.</li> <li>➤ Allow instruction beyond the classroom and into the higher-level education, supporting collaboration.</li> <li>➤ Customise teaching methods for each student based on their personal data.</li> <li>➤ Help instructors create personalized learning plans for each student.</li> </ul>
Learning	<ul style="list-style-type: none"> <li>➤ Uncover the learning shortcomings of students and address them early in education.</li> <li>➤ Customize the university course selection for students.</li> <li>➤ Predict the career path for each student by gathering study data.</li> <li>➤ Detect learning state and apply intelligent adaptive intervention to students</li> </ul>

Source: (Chen, Chen, & Lin, 2020)

intelligence by the faculty. Faculty members, teachers, play important role in the educational institution in imparting knowledge. Adopting and accepting artificial intelligence-based technology by faculties and academic experts in education is necessary for the successful integration of artificial intelligence technology. Faculties, teachers, academic community may be concerned about the academic integrity, job displacement, academic performance. This can hinder the teachers, academicians from teachers adopting artificial intelligence in education. Introduction of artificial intelligence technology in education should be perceived with a positive mindset (Ocaña-Fernández, Valenzuela-Fernández, & Garro-Aburto, 2019).

Many faculties, academic experts fear that artificial intelligence in education will replace the traditional teaching practices which will lead to job losses or undermine the role human educators. In the artificial intelligence development process faculties, academic experts should be involved in designing, development and implementation of artificial intelligence technology. Faculties and teachers should be given adequate training to handle artificial intelligence and use it accordingly for promotion and career development. This will overcome the fear of artificial intelligence and promote faculty acceptance in higher education (Ocaña-Fernández, Valenzuela-Fernández, & Garro-Aburto, 2019).

Artificial intelligence enabled education has given opportunities for the advancements in higher education. Apart from opportunities, artificial intelligence has raised challenges too. Due to the pandemic COVID 19, organizations, policy makers, administrators opted for budgetary cut, less allocation of funds across the globe. Administrators may opt for replacing the teachers, faculties with automated artificial intelligence solutions. With the increase of artificial intelligence automation in teaching, personal communication between parents, students, teachers will decline. Students will be at risk of getting addicted to a new form of technology and this addiction will impact the learner's behaviour and cognitive thinking. Due to excessive dependence on artificial intelligence technology, personal connections will be at risk (Kengam, 2020).

The application of artificial intelligence technology is expensive, needs lots of resources, time consuming, technological expertise, infrastructure, investments and leadership skills. The installation cost, maintenance cost, and repairing cost of artificial

intelligence are very expensive. Only the heavily funded large corporate style educational institutions can afford this investment. In case of a natural disaster or accident, there can be a loss of data or data breach. We do not know the degree of the data loss. Staff, faculty, and administrators should be given adequate training about how to use artificial intelligence technology. Artificial intelligence should not be perceived as a burden but seen as a tool for improvement. Adaptability to artificial intelligence technology will take time (Bhatnagar, 2020).

Machines and artificial intelligence are now performing most of the tasks in every field. This has also affected the social lives of people. Machines, artificial intelligence lack emotions, cannot support culture, traditions. With the increased role of artificial intelligence in education, teacher's role is important in the bringing and developing the human side, emotions and ethical values in students. artificial intelligence cannot teach students about the importance of emotions and values (Bhatnagar, 2020).

The communication process is incomplete without the use of kinesics. Artificial intelligence can't use the gestures, movement of fingers, facial expressions, eye contact which are used by the faculties in classroom teaching. Kinesics is an important part of pedagogy. Artificial intelligence in education lacks the kinesics aspect (Bhatnagar, 2020).

### **Ongoing Questions for Researchers in Artificial Intelligence in Education**

There is no doubt that artificial intelligence in education has provided many opportunities for optimizing administrative tasks of daily routine, improved learning pedagogy, increased personalized guidance, quick data driven decision making process and innovative pedagogical approaches. Apart from these positives of artificial intelligence in education, there are questions that need to be considered and investigated thoroughly. These questions need to be addressed for the benefit of society and specifically focussing on artificial intelligence in education (Cardona, Rodríguez, & Ishmael, 2023)-

- i. To what extent the artificial intelligence technology is enhancing the learning rather than replacing the human control and judgement of student learning?
- ii. How will the users understand the legal and ethical implications of sharing the sensitive private data

with artificial intelligence enabled technologies and how to mitigate and minimize the risk of data privacy and data breach?

- iii. To what extent does artificial intelligence technology account for the complex social dynamics of how people communicate, interact, work, and learn together, or is the technology leading human beings to narrow or oversimplify the communication process?
- iv. To what extent are the technical indicators and human observations of bias and unfairness working together with the human observations?
- v. How can ethics and equity in artificial intelligence technology become actionable both in research and development?
- vi. Under what conditions artificial intelligence technology give desired results and avoid undesirable discrimination, bias or negative outcomes?

### **Suggestions and Way Forward**

Following steps are needed to address the challenges of artificial intelligence in education (Aldosari, 2020):

1. Increased awareness among the students, faculties, artificial intelligence developers, for safe usage of artificial intelligence in education.
2. Attentions should be given to the challenges that are arising from the application of artificial intelligence to jobs and the role of academicians, instructors, administrators, in universities and educational institutes.
3. More academic conferences and seminars to be organized on the issues and challenges prevalent in artificial intelligence.
4. Multinational companies involved in developing artificial intelligence technology should inform people, about the benefits of artificial intelligence, which will remove the fear about the adoption of artificial intelligence technology.
5. Academic researchers in artificial intelligence should conduct more researches on the future of artificial intelligence's impact in education, on society and student faculty relationship.

### **Conclusion**

Education has the potential to revolutionize education delivery mechanism in schools and universities. Artificial intelligence in education will

lead efficient and effective learning experiences for the students and teaching experiences for the faculties involved. Since adoption of artificial intelligence in education leads to personalized guidance, adaptive learning methods, more student's engagement, quick administrative processes. There are also certain challenges in artificial intelligence in education that need to be addressed like data privacy, ethics to be followed and high investment cost, trained faculties and administrators to use artificial intelligence technology. Artificial intelligence should be used carefully to maximize the productivity and reduce the errors, but ethical provisions must be kept in mind. Educational institutes, administrators should develop the guidelines, policies and best practices while using the artificial intelligence. Artificial developers, government agencies, should play active role in addressing the challenges and hurdles in using artificial intelligence technology. Regular training sessions for faculty and administrators should be organized for the successful implementation of artificial intelligence driven transformation in higher education. Teachers, faculties should effectively integrate artificial technology into teaching skills. Artificial intelligence will not replace the faculties but it will contribute in enhancing their teaching capabilities, empower the administrators, make the pedagogy adaptable according to students learning capacity. Although application of artificial intelligence is costly technology but with new researches coming regularly, we can minimize the cost factor in the future. Artificial technology will fill the teaching learning void and increase the productivity. In artificial intelligence technology, the security and privacy of students, teachers and other human data should be ensured through legal provisions. Developers and executing organizations of artificial intelligence technology in education should necessarily take strong steps to minimize bias and promote fairness in artificial intelligence models. The artificial intelligence model in education should work on the principle of efficacy and work for diverse learners and in varied type of educational settings. Government should frame policies that promote transparency about the artificial intelligence models that are embedded in the educational systems. Research and development in artificial intelligence should be based on the best and most current principle of teaching and learning. Artificial technology should help us to achieve educational objectives when users trust it.

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# Recalibration of Credentialing in the Era of Flexible, Experiential and Personalized (FLEXPER) Learning

Neeraj Saxena\*

The educational landscape has drastically changed in a short time, resulting in distinct eras in education viz. Education 1.0 to 4.0, and now 5.0 being touted. Significant shifts in pedagogy, technology, and educational philosophy have marked each version; interestingly, with their time-span shrinking. The internet and its universalized access through mobile platforms have made educational content available to a broader audience. Learners can now access textbooks, lectures, research materials, and educational apps anytime, anywhere, and in multiple global languages. Mobile apps and platforms also facilitate collaborative learning, enabling learners to work on group projects, share notes, and engage in discussions with peers and instructors. Moreover, adaptive learning apps on smartphones can customize educational content to individual student needs, allowing them to learn at their own pace and focus on areas that require improvement.

Beyond formal learning, mobile platforms provide opportunities for non-formal education, including language learning, coding, and hobby development. Users can access bite-sized lessons and practice at their convenience, eliminating the need to wait for specific learning opportunities. Skill-building in areas such as photography, cooking, fitness, and more, often through interactive and engaging apps, has become possible without stepping out of the house. As a result, individuals are equipped to pursue personal interests and passions outside the traditional classroom setting.

Within the realm of mobile learning platforms, learners can engage in lifelong education through online courses, webinars, and educational podcasts, all accessible through their smartphones. These platforms empower individuals to continually acquire new knowledge and skills. Social media and online forums on smartphones connect lifelong learners with like-minded individuals, creating communities where they can share resources, experiences, and insights. Smartphones also provide access to professional

development resources, including certifications, conferences, and industry-specific news, supporting lifelong career growth. This transformative shift has changed the educational landscape, necessitating a reflection of how we acknowledge the acquisition of knowledge through credentialing.

Credentialing is a fundamental process in education that validates an individual's skills, knowledge, and qualifications. It serves as a powerful tool for individuals to showcase their expertise and for employers to assess potential candidates. Various forms of credentialing have existed in human society for centuries. In ancient times, individuals received credentials in the form of written documents, letters of recommendation, or seals of approval from authoritative figures. These credentials often carried significant weight and served as a testament to one's abilities and trustworthiness.

The industrial revolution in the 18th and 19th centuries led to the establishment of formal education systems and standardized credentialing processes. Traditional degrees, such as diplomas and certificates, became the gold standard for education and were essential for career advancement. This system, with instructors and instructions at the centre, has evolved in response to the needs of industrial society and has been offering a structured path for individuals to acquire knowledge and skills and validate their expertise. In this teacher-centric education approach, the curriculum, pace, and assessment are typically determined by the teacher or educational institution. The emphasis is on the completion of a predetermined set of courses and requirements, with degrees as the central focus. Degrees serve as the primary indicator of a learner's educational attainment and readiness for the workforce. However, this approach is developing towards a learner-centric model with universalization of access to knowledge.

In the emerging learner-centric education approach, the educational system adapts to the learner's preferences and progress. Learner-centric credentialing should then be geared towards competency-based assessments, evaluating learners

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based on their ability to demonstrate specific skills or knowledge, regardless of the time it takes to acquire them. Credentials may be issued in a more flexible and modular manner, allowing learners to accumulate them at their own pace. While traditional degrees still hold value, they are no longer the sole focus, as experience and skills get privileged over knowledge at workplaces. Learners may pursue degrees as part of their educational journey, but they are to be supplemented with badges and other micro-credentials to provide a more comprehensive picture of a learner's abilities.

The incursion of technologies such as artificial intelligence, extended reality, brain-computer interface, cyber-physical systems, and quantum technologies is set to reshape the educational landscape. The democratization of knowledge has rendered traditional approaches redundant, and experiential learning is gaining traction, with experience replacing knowledge as currency in academics. Let's not forget, an education system that's been there for over two centuries was designed to upload knowledge into learner's mind, to address just-in-case requirements. Further, examinations were introduced as dip-sticks to check levels of retention of that knowledge before issuing a degree; and the ability to regurgitate knowledge became the meter of general proficiency. In the transforming educational world, the need now is for credentialing learning that is flexible, experiential and personalized (FLEXPER)- bundles abilities, competencies, skills, and knowledge.

FLEXPER learning- circumscribing internships, apprenticeships, volunteer work, and other hands-on experiences, will become more and more valuable than classroom learning. For credentialing such learning effectively, various strategies and approaches can be implemented:

- **Prior Learning Assessment (PLA):** Establish a process for conducting prior learning assessments to evaluate the knowledge and skills acquired through experiential learning, offering course credit or exemptions based on the results.
- **Structured Internship/ Apprenticeship Programs:** Develop structured internship/ apprenticeship programs in collaboration with industry partners, including defined learning objectives, mentorship, and assessment criteria. Award certificates or credentials upon successful completion.

- **Competency-Based Education (CBE):** Shift towards a competency-based education model, where learners demonstrate mastery of specific skills or competencies. Experiential learning can be a key component, with credentials based on the ability to meet predefined competencies.
- **Digital Badges and Micro-Credentials:** Develop digital badges or micro-credentials tailored to different experiential learning experiences, representing specific skills or competencies gained. Collaborate with employers, community organizations, and educational institutions to design and award these badges.
- **Portfolio Assessment:** Encourage learners to create portfolios that document their experiential learning journey, including reflective essays, project reports, photographs, and other evidence.
- **Standardized Assessments and Portfolios:** Develop standardized assessments or portfolio requirements for specific types of experiential learning, ensuring rigor and alignment with learning outcomes.
- **Collaboration with Industry and Professional Associations:** Partner with industry and professional associations to create recognized credentials for experiential learning, leveraging their expertise to design assessment criteria.
- **Licensing:** Collaborate with professional/licensing bodies to recognize experiential learning as a pathway to professional credentials, establishing guidelines and criteria for qualification.
- **Collaboration with Employers:** Engage employers in the credentialing of experiential learning by designing and recognizing specific programs or internships. Employer endorsements carry weight in this process.
- **Workplace Certification Programmes:** Many industries offer certification programs based on experiential learning, validating practical skills in fields like IT, healthcare, and project management.
- **Lifelong Learning Records:** Establish lifelong learning records that include both formal educational achievements and experiential learning experiences, with a standardized format for easy sharing.

The credentialing of FLEXPOR learning in the learner-centered setting is a complex yet increasingly important endeavour in the modern educational landscape. The approaches to credentialing will continue to evolve, driven by digitalization and the demand for security and traceability. Digital badges and micro-credentials will gain wider acceptance, especially in non-formal and lifelong learning contexts. Artificial intelligence and machine learning will personalize learning pathways and assess competencies. The integration of blockchain technology will enhance the security and transparency of digital credentials.

In the future, Augmented and Virtual Reality (AR/VR) will enable immersive learning experiences, potentially leading to AR/VR-based credentials. AI-driven chatbots and virtual mentors will provide personalized guidance to learners, and international standards for digital credentials will become more established, facilitating global recognition. Learning ecosystems will be highly interconnected, allowing seamless transitions between formal, non-formal, and informal learning. Brain-computer interfaces and neurofeedback technologies may offer new ways to assess and credential learning directly from neural interfaces. Credential fraud prevention measures will become even more sophisticated, thanks to advancements in cybersecurity.

We must be alive to the fact that degrees are losing their appeal in the age of digital learning and it is for two primary reasons: knowledge, which can quickly become obsolete, can now be accessed outside formal systems, and skills that can be acquired in months cannot be gagged by years (required to earn a degree). Education must evolve as flexible, experiential, and

personalized learning, catalyzed by technological advancements. Credentialing learning in these formats will continue to evolve, leveraging technologies like blockchain, artificial intelligence, and neurofeedback. Over the next 25 years (overlapping with our Amrit Kaal), we can anticipate increased standardization, personalization, and security in the credentialing process, ensuring that learners receive recognition for their diverse, discrete, and uninhibited learning experiences.

In alignment with the transformative vision laid out in the National Education Policy 2020 by the Government of India, the evolution of credentialing is set to play a pivotal role in reshaping the educational landscape. This policy emphasizes flexibility, experiential learning, and the integration of technology to create a holistic and learner-centric approach to education. As we move forward, it is essential that educational institutions, policymakers, and industry stakeholders collaborate to bridge the gap between traditional degrees and modern, experiential forms of learning. The successful implementation of credentialing approaches enunciated in this article will not only empower learners to thrive in a rapidly changing world but also provide the agility and adaptability needed to meet the demands of the 21st-century workforce. Together, we can ensure that education remains a dynamic and lifelong pursuit, where the recognition of learning experiences through innovative credentialing approaches becomes the norm, guiding our journey toward a brighter and more inclusive educational future.

Note: The views/opinions expressed in this article are those of the author. They do not purport to reflect the opinions or views of his organisation.

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**Editor**

# Beyond Degrees: Navigating the Digital Frontier in Higher Education Credentialing

Subhajit Panda\*\* and Navkiran Kaur\*\*

The landscape of higher education is undergoing a transformative shift catalyzed by digital credentialing. This paper delves into the dynamic realm of digital badges, micro-credentials, and online degrees, exploring their impact on education accessibility, learning methodologies, and employability in the contemporary global context. From robust online platforms fostering interactive learning to the innovative use of blockchain technology ensuring credential authenticity, the study navigates the multifaceted aspects of digital credentialing. The research critically analyzes challenges such as standardization, credibility assurance, and integration within existing curricula, proposing practical solutions and best practices. It emphasizes the pivotal role of industry collaborations, personalized learning paths, and interdisciplinary integration in enhancing the value of digital credentials. The paper sheds light on the socio-economic aspects, addressing issues of affordability, the digital divide, and financial accessibility. Moreover, it explores the future trajectory of digital credentialing, emphasizing lifelong learning, global collaboration, and regulatory frameworks. By examining the strengths, limitations, and innovations in digital credentialing, this paper provides a comprehensive overview, guiding educators, institutions, and policymakers toward informed decisions in the evolving landscape of education.

The landscape of higher education credentialing is undergoing a seismic shift due to digital transformation (Chakroun and Keevy, 2018). Traditional methods of validating knowledge and skills are evolving rapidly, merging education and technology. In this interconnected world, the need to reevaluate how credentials are earned, verified,

and recognized is paramount. This digital revolution signifies a fundamental reimagining of education, democratizing it through tangible avenues like digital badges, micro-credentials, and online degrees (Peisachovich et al., 2021). These advancements break down barriers, foster lifelong learning, and align education seamlessly with the demands of a rapidly changing global economy (Varthana, 2023).

In this context, this research sets out to explore critical questions: How do emerging technologies like blockchain, artificial intelligence, and immersive experiences impact credentialing? What challenges and ethical considerations accompany this transformation? How can institutions ensure the integrity and accessibility of digital credentials? Our objectives are twofold: to dissect the complexities of this digital frontier and to provide actionable insights that empower educators, policymakers, and stakeholders to navigate this transformative journey effectively.

This study's scope extends beyond the mere technical aspects of digital credentialing; it delves into the sociocultural, ethical, and pedagogical dimensions. Understanding these multifaceted dynamics allows a comprehensive grasp of the full implications of this digital shift. The importance of this study lies in its potential to inform policies, guide educational practices, and inspire innovation, shaping a future where education is not confined to geographical boundaries or socioeconomic limitations.

## Literature Review

The exploration of digital credentials in higher education has undergone significant scrutiny. Fedock et al. (2016) emphasized the role of digital badges and micro-credentials as alternative assessments, fostering diverse learning outcomes and individual achievements. Carey and Stefaniak (2018) stressed the importance of clear evaluation criteria for skill-based badges, ensuring their meaningful implementation. Jorre (2020) highlighted the challenges related to public scrutiny of digital credentials, emphasizing the need for transparent assessment practices.

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Amidst the COVID-19 pandemic, Ahmat et al. (2021) underscored the swift adoption of micro-credentials, providing accessible and flexible educational opportunities globally. Ralston's study in 2021 examined the shift towards micro-credentialing, emphasizing its efficiency in aligning education with industry demands. Pollard and Vincent (2022) explored micro-credentials' potential to foster diverse subjectivities through critical pedagogy approaches.

Ali and Khan (2023) highlighted micro-credentials' agility and digital nature, making them essential tools in skill enhancement and job market responsiveness. Jangjarat et al. (2023) emphasized technology's transformative impact on education management, despite challenges such as the digital divide. Kiiskilä et al. (2023) delved into learners' perceptions of digital credentials' value, providing insights into their significance in higher education contexts. Miao et al. (2023) revealed students' positive attitudes towards technology-driven micro-credential programs, underscoring their vital role in skill enhancement. The main objective of this paper is to:

- i) Examine shifts in traditional credentialing methods.
- ii) Investigate the emergence and functions of digital badges.
- iii) Explore the benefits and tailored learning experiences of micro-credentials.
- iv) Assess online degrees' accessibility and quality in education.
- v) Identify and analyze security, standardization, and ethical issues in digital credentialing.

### **Traditional Degree Programmes: Strengths and Limitations**

Traditional degree programmes have long been the cornerstone of higher education, offering in-depth knowledge, structured curriculum, and recognized qualifications. However, these programmes come with their own set of strengths and limitations, which are essential to consider in the context of the evolving landscape of education.

#### **Strengths**

*Comprehensive Education:* Traditional degrees offer in-depth theoretical knowledge across diverse subjects in a specific field.

*Credibility:* Degrees from accredited institutions are widely recognized, enhancing graduates' employability.

*Structured Curriculum:* Traditional programs provide meticulously planned curricula, ensuring logical knowledge progression.

*In-Person Interaction:* Facilitates face-to-face student-professor interactions, fostering engagement and immediate feedback.

#### **Limitations**

*Time Constraints:* Traditional degrees demand lengthy full-time study, limiting workforce entry and flexibility.

*Financial Burden:* High costs, including tuition, books, and living expenses, pose accessibility challenges.

*Limited Flexibility:* Rigid schedules hinder students with work, family, or personal commitments.

*Curricular Challenges:* Traditional programs may struggle to keep pace with evolving industry needs, risking curriculum relevance.

### **Rise of Digital Credentials: An Overview**

In recent years, digital credentials have emerged as a transformative force in higher education, reshaping the way skills and achievements are recognized and validated (Bingöl, 2023). This section provides an overview of the evolution of digital credentials, showcasing their growth year by year through an evaluation graph.

#### **Evolution of Digital Credentials (Ellis et al., 2016)**

*Early Adoption (2000s - 2010):* The concept of digital credentials started gaining traction in the early 2000s with the emergence of online learning platforms. Early adopters experimented with digital badges and certificates, exploring their potential in validating online skills and courses.

*Widespread Recognition (2011 - 2015):* Between 2011 and 2015, digital credentials gained widespread recognition as major universities and institutions started offering online courses on platforms like Coursera, edX, and Udacity. These platforms introduced digital certificates for course completion, enhancing the credibility of online education.

*Standardization and Accreditation (2016 - 2018):* During this period, efforts were made to standardize digital credentials. Organizations like Mozilla introduced the Open Badges standard, providing a common framework for issuing and displaying digital badges. Accrediting bodies began acknowledging the value of digital badges, leading to increased acceptance in the professional world.

*Integration with Formal Education (2019 - 2021):* The integration of digital credentials with formal education became more prevalent. Many universities and colleges started offering digital badges and certificates as part of their degree programs. Employers began recognizing the relevance of these credentials and considering them in hiring processes.

*Technological Advancements (2022 - Present):* In recent years, technological advancements, including blockchain technology, have further enhanced the security and authenticity of digital credentials. Blockchain ensures the immutability of credentials, making them tamper-proof and verifiable, which

has significantly contributed to the rise of digital credentials' credibility and trustworthiness.

### **Comparative Analysis of Traditional Degrees and Digital Credentials**

Traditional degrees and digital credentials represent distinct yet complementary approaches to education and credentialing. Table-1 provides a comparative analysis of these two educational pathways, considering various factors such as accessibility, credibility, flexibility, and adaptability.

#### **Technological Advancements Shaping Credentialing**

In the fast-paced digital landscape, technological advancements are revolutionizing the way credentials are created, shared, and verified (Helvacilar , 2023). The following are some key technological innovations shaping credentialing processes, and enhancing their efficiency, security, and accessibility.

*Blockchain Technology:* Blockchain ensures tamper-proof and secure digital credentials. Each credential is encrypted and linked in a chain, ensuring

**Table-1 :Comparative Analysis of Traditional Degrees and Digital Credentials**

<b>Parameters</b>	<b>Traditional Degrees</b>	<b>Digital Credentials</b>
Accessibility	Traditional degrees often require full-time attendance at physical campuses, limiting access for individuals with geographical, financial, or time constraints.	Digital credentials, being online-based, offer unparalleled accessibility. Learners from diverse backgrounds and locations can access courses and earn credentials remotely, breaking down geographical barriers.
Credibility	Degrees from reputable institutions carry significant credibility and are widely recognized by employers. They undergo rigorous accreditation processes, ensuring high academic standards.	Digital credentials, especially those from respected platforms and institutions, have gained credibility. Open Badges and blockchain technology enhance their authenticity and allow for easy verification, contributing to their recognition.
Flexibility	Traditional degree programs often follow rigid schedules, making it challenging for students to balance education with work or other commitments.	Digital credential programs are known for their flexibility. They offer self-paced learning, allowing individuals to study at their own convenience, and making education accessible to working professionals and non-traditional students.
Adaptability	Traditional curricula might struggle to keep pace with rapidly evolving industries, leading to potential gaps between academic knowledge and real-world skills.	Digital credentials can respond swiftly to industry demands. They often focus on specific, in-demand skills, ensuring learners acquire relevant knowledge aligned with current market needs.
Cost	Pursuing a traditional degree can be costly, including tuition, textbooks, accommodation, and other expenses.	Digital credential programs are generally more cost-effective. They often have lower tuition fees, and online learning eliminates additional costs like commuting or accommodation.

authenticity, and enabling instant verification. It prevents fraud, simplifying verification for employers and institutions.

*Artificial Intelligence (AI) and Machine Learning (ML):* AI assesses skills in real time, offering instant feedback and personalized learning. ML identifies patterns, enabling institutions to align curricula with industry demands, and ensuring credentials meet market needs.

*Augmented Reality (AR) and Virtual Reality (VR):* AR and VR revolutionize practical skill acquisition. Learners practice tasks in safe, virtual environments, vital in fields like healthcare and engineering. Credentialing with AR and VR ensures relevant, high-quality skills, improving workforce readiness.

*Digital Identity and Biometrics:* Digital identity verification methods, including biometric authentication such as fingerprint and facial recognition, enhance the security of credentialing processes. Institutions verify identities, reducing fraud risk. Digital systems streamline administrative tasks, ensuring efficient and reliable credential management.

*Data Encryption and Privacy:* Advanced encryption secures credentials. Privacy technologies like zero-knowledge proofs verify credentials without revealing personal data, enhancing user privacy and data protection.

### **Digital Badges: A New Frontier**

Digital badges, a departure from traditional higher education credentials (Wilson et al., 2016), offer versatile recognition of skills (Digitary, 2023). They visually represent skills and are encoded with metadata, ensuring authenticity, and enabling online verification. Digital badges act as micro-credentials, shareable on social media, resumes, and professional sites, facilitating easy skill assessment for learners and employers.

#### ***Types of Digital Badges***

Digital badges come in various types, some of which are discussed below:

*Recognition Badges:* These badges acknowledge the completion of a specific task or course. They are often used in educational settings to validate the successful completion of modules or workshops.

*Skill Endorsement Badges:* Skill endorsement badges validate a particular skill or competency. They are typically issued after assessing a person's ability to apply specific skills in real-world scenarios.

*Achievement Badges:* Achievement badges recognize significant milestones or accomplishments. These could include completing a degree program, mastering a complex subject, or contributing substantially to a project.

*Participation Badges:* Participation badges are awarded for involvement in specific events, seminars, or collaborative projects. They recognize a person's active engagement and contributions to a group effort.

*Competency-Based Badges:* Competency-based badges are highly specific and focus on particular skills or knowledge areas. They indicate a person's proficiency in areas such as programming languages, data analysis, or leadership skills.

*Open Badges:* Open badges adhere to a set of technical standards, allowing learners to display their achievements across various platforms and environments. These badges are shareable and can be verified online, enhancing their credibility and usefulness.

### **Integration of Digital Badges in Higher Education: Challenges and Solutions**

The integration of digital badges into higher education comes with a set of challenges, but innovative solutions have been developed to address these issues and maximize the benefits of badge implementation (Stefaniak & Carey, 2019).

#### ***Challenges in Implementation***

*Standardization:* Establish consistent badge design, criteria, and metadata standards to ensure clarity and recognition.

*Awareness:* Educate learners and instructors about digital badges' value for widespread acceptance.

*Credibility and Quality Assurance:* Implement rigorous quality assurance processes to maintain badge integrity and authenticity.

*Integration:* Seamlessly integrate badges into curricula, aligning them with course objectives through collaboration.

*Technological Infrastructure:* Invest in robust platforms to support badge creation, issuance, and verification efficiently.

### ***Solutions and Best Practices***

*Development of Standards:* Collaborate for clear badge standards, covering design, issuance criteria, and metadata.

*Training Programmes:* Conduct workshops and webinars to increase digital badge awareness among educators and students.

*Quality Assurance:* Implement peer reviews and audits to maintain badge credibility and authenticity.

*Industry Collaboration:* Partner with industry experts for real-world skill alignment in badge design and evaluation.

*User-Friendly Platforms:* Use intuitive interfaces and seamless integrations for simplified badge creation and management.

### **Impact on Learning Outcomes and Skill Development**

The integration of digital badges has profoundly influenced learning outcomes and skill development in higher education. The following points highlight the significant impact these innovations have on learners' knowledge acquisition and the development of practical skills.

***Personalized Learning:*** Badges enable tailored learning paths, promoting self-directed education aligned with career goals.

***Enhanced Engagement:*** Gamification elements boost motivation and active participation, fostering a sense of accomplishment.

***Instant Feedback:*** Badges offer immediate recognition, reinforcing positive behaviors and encouraging continuous improvement.

***Industry Alignment:*** Collaboration with experts ensures badges represent current industry demands, enhancing students' job readiness.

### **Micro-Credentials: Enhancing Specialized Skills**

Micro-credentials offer targeted and focused learning experiences, allowing individuals to acquire specialized skills that are directly applicable to their chosen fields (Maina et al., 2022). This section

explores the various types and formats of micro-credentials, emphasizing their adaptability and relevance in today's dynamic job market.

### ***Types and Formats of Micro-Credentials***

*Certificate Programmes:* Offer in-depth knowledge through courses, assessments, and projects for comprehensive skills.

*Digital Badges:* Validate specific skills, issued by institutions or organizations, showcasing expertise.

*Stackable Credentials:* Accumulate credentials over time, building expertise and offering flexible career pathways.

*Nanodegree Programmes:* Intensive, tech-focused programs with hands-on projects and real-world applications.

*Specialization Tracks:* Tailored courses in areas like data science or marketing, focusing on specific industries or roles.

*Skill-specific Certifications:* Validate expertise in tools or methodologies, enhancing credibility in the job market.

*Project-based Badges:* Earned through real-world projects, showcasing problem-solving and critical thinking skills.

### **Integration into Higher Education Curriculum**

The integration of micro-credentials into higher education curricula has become a transformative approach, enhancing the educational experience and preparing students for the demands of the contemporary job market (Ahsan et al., 2023). This section delves into the strategies and benefits associated with the seamless integration of micro-credentials into traditional academic programs.

#### ***Curricular Alignment***

*Objective Alignment:* Educators align micro-credentials with course objectives for relevance.

*Interdisciplinary Integration:* Integrating diverse micro-credentials fosters creativity and problem-solving skills.

#### ***Blended Learning Environment***

*Flexible Learning:* Micro-credentials offer online and on-campus options, accommodating diverse learning preferences.

*Collaborative Projects:* Encourage teamwork and communication, simulating real-world professional environments in coursework.

### **Professional Development Opportunities**

*Embedded Skill Development:* Embedded micro-credentials enhance competencies, boosting graduates' job market competitiveness.

*Industry Engagement:* Real-world projects and case studies enrich learning, preparing students for professional expectations.

### **Formative Assessment and Feedback**

*Continuous Evaluation:* Micro-credentials offer real-time feedback, enabling students to refine skills and address areas of improvement promptly.

*Individualized Learning Paths:* Tailor education to individual interests and career goals, enhancing students' alignment with specific aspirations.

### **Industry Recognition and Employability**

The recognition of micro-credentials by industries and employers has become a vital factor in shaping the employability of graduates. This section explores the significance of industry recognition and how micro-credentials contribute to student's readiness for the job market.

#### **Industry-Endorsed Skill Sets**

*Industry-Relevance:* Micro-credentials fill industry skill gaps, aligning with current job demands and trends through collaborations with industry partners.

*Credibility Boost:* Partnerships with organizations validate micro-credentials, enhancing their quality and applicability, bolstering industry recognition.

#### **Increased Employability**

*Skill Validation:* Micro-credentials provide tangible proof of candidates' practical abilities, enhancing their employability.

*Competitive Edge:* Graduates with micro-credentials demonstrate continuous learning and proactive skill development, gaining a competitive advantage in the job market.

#### **Enhanced Career Progression**

*Career Advancement:* Micro-credentials enable upskilling, enhancing eligibility for promotions or lateral moves within organizations.

*Workforce Versatility:* Professionals adapt to changing roles and industry demands, ensuring long-term employability through the quick acquisition of new skills.

### **Recognition beyond Academia**

*Value Across Sectors:* Micro-credentials are recognized in academia and diverse industries, emphasizing their transferability and relevance in evolving job markets.

*Continuous Learning Culture:* Micro-credentials foster continuous learning, showcasing candidates' commitment to skill expansion and professional growth, valued by employers.

### **Skill Portfolios**

*Comprehensive Skill Sets:* Micro-credentials help build diverse skill portfolios, enhancing candidates' appeal to employers seeking versatile professionals.

*Tailored Skill Development:* Candidates can choose micro-credentials aligning with their career goals, crafting personalized skill portfolios for specific roles and industries.

### **Online Degrees: Bridging Accessibility and Quality**

Online education has emerged as a powerful bridge, connecting accessibility and quality in higher learning (Haleem et al., 2022). This section delves into the ways online degrees are reshaping the educational landscape, making quality education accessible to a broader spectrum of learners.

#### **Trends in Online Degree Programmes**

The landscape of online degree programs has experienced significant evolution, blending accessibility with high-quality education (Black et al., 2019). This section explores the prevailing trends in online degrees, emphasizing the intersection of accessibility and educational excellence.

*Hybrid Learning Models:* Online degrees blend virtual classes with in-person experiences, offering flexibility and valuable face-to-face interactions, enhancing accessibility and education quality.

*Interactive Multimedia Content:* Modern online degrees incorporate engaging resources like video lectures and virtual labs, facilitating active learning and improving accessibility for students worldwide.

*Personalized Learning Pathways:* Adaptive technologies create tailored learning experiences, catering to individual strengths and weaknesses, ensuring personalized education that enhances accessibility and quality.

*Collaborative Online Learning:* Online degrees emphasize group projects and peer interactions, fostering community among learners, promoting active engagement, and enhancing the education's quality and accessibility.

*Industry-Integrated Curricula:* Collaboration with businesses ensures relevant, up-to-date content, is directly applicable to real-world scenarios, enhancing education quality, employability, and accessibility.

*Mobile Learning Platforms:* Optimized for mobile devices, online degrees allow anytime, anywhere access, eliminating geographical constraints, ensuring accessibility, and providing quality education at learners' convenience.

vii) *Continuous Support Services:* Academic advisors, tutoring, and technical assistance offer ongoing support, promptly addressing challenges, enriching the educational experience, and ensuring accessibility for all learners.

## **Quality Assurance and Accreditation in Online Education**

Ensuring the quality of online education is paramount to maintaining the credibility and effectiveness of online degree programs (Yang & Cornelious, 2004). This section explores the essential aspects of quality assurance and accreditation in the realm of online education.

### ***Accreditation Standards***

*Regional Accreditation:* Online programs pursue recognized regional accreditation, ensuring high academic standards, irrespective of delivery mode, and promoting accessibility and quality education.

*Programme-Specific Accreditation:* Professional online programs, like nursing or engineering, obtain industry-specific accreditation, guaranteeing graduates meet industry standards, and enhancing career readiness and program quality.

### ***Rigorous Assessment and Evaluation***

*Faculty Qualifications:* Online programs maintain faculty qualifications equivalent to traditional

programs, ensuring expertise and high-quality education delivery.

*Ongoing Program Assessment:* Continuous assessment ensures online courses align with objectives, driving improvements in content, delivery, and student outcomes, enhancing educational quality.

### ***Technology and Infrastructure***

*Robust Online Platforms:* Institutions invest in user-friendly platforms, enabling interactive engagement, content delivery, and assessments for an enhanced learning experience.

*Technical Support:* Online programmes provide prompt technical support, ensuring a smooth learning experience for both students and faculty.

### ***Student Support Services***

*Academic Advising:* Online students receive guidance on courses and program requirements, ensuring informed decision-making and progress tracking.

*Student Engagement:* Online programmes promote engagement via forums and virtual interactions, enhancing academic success through active participation.

### ***Transparency and Accountability***

*Information Accessibility:* Online programmes offer transparent details on outcomes, faculty, and accreditation, aiding informed student decisions.

*Reporting and Accountability:* Institutions maintain high standards, regularly reporting outcomes and accreditation to ensure accountability and transparency.

### ***Continuous Improvement***

Online education programmes prioritize continuous improvement by soliciting feedback from students and faculty. This feedback informs changes in course content, delivery methods, and student support services, ensuring ongoing quality enhancement.

### ***Industry Alignment***

Online degree programs collaborate with industry experts and employers to align their curriculum with industry needs. Industry input ensures that graduates are well-prepared for the workforce and meet industry-specific standards.

## **Student Experiences and Challenges in Online Degree Pursuits**

Online degree programs offer unprecedented flexibility and accessibility, enabling a diverse range of students to pursue higher education. However, this mode of learning comes with its unique set of experiences and challenges. This section delves into the various aspects of student experiences in online degree pursuits, highlighting both the positive aspects and the obstacles they might encounter.

### ***Positive Student Experiences***

#### *Flexibility and Convenience*

- **Self-Paced Learning:** Online degrees allow students to learn at their own pace, accommodating work schedules, family commitments, and personal responsibilities.
- **Anywhere, Anytime Access:** The ability to access lectures and materials from any location fosters convenience, enabling students to balance education with other aspects of their lives.

#### *Diverse Learning Opportunities*

- **Global Interaction:** Online platforms facilitate interactions with peers from diverse cultural backgrounds, enriching the learning experience with varied perspectives and insights.
- **Access to Resources:** Students have access to a wealth of online resources, including e-books, journals, and multimedia materials, enhancing their research and knowledge acquisition.

### ***Personalized Support***

- **Dedicated Instructors:** Online educators often provide personalized attention, addressing individual student queries and concerns promptly.
- **Peer Collaboration:** Collaborative online tools promote peer-to-peer learning and collaboration, fostering a sense of community among students.

### ***Challenges in Online Degree Pursuits***

#### *Technical Issues*

- **Internet Connectivity:** Limited internet access or unreliable connections can hinder participation, causing frustration and impeding learning progress.

- **Technology Literacy:** Students with limited digital literacy may struggle with navigating online platforms, accessing resources, and participating in virtual discussions..

#### *Time Management*

- **Self-Discipline:** Online learning requires strong self-discipline and time management skills. Students must balance coursework with work, family, and social commitments, which can be challenging.
- **Procrastination:** Without fixed schedules, some students may procrastinate, leading to rushed assignments and subpar learning experiences.

#### *Lack of Social Interaction*

- **Isolation:** The absence of physical classrooms and face-to-face interactions can lead to feelings of isolation, impacting students' motivation and engagement.
- **Limited Networking:** Online students may have fewer opportunities for networking and building professional relationships, which are integral to career development.

#### *Assessment and Proctoring*

- **Exam Integrity:** Ensuring exam integrity in online settings is a challenge. Implementing secure online proctoring methods while maintaining a comfortable testing environment for students is crucial.
- **Fair Evaluation:** Designing assessments that accurately evaluate students' knowledge and skills without the possibility of cheating or plagiarism requires innovative approaches.

#### *Support Services*

- **Availability of Real-Time Support:** While online programs offer support services, students in different time zones might face challenges accessing real-time support due to the varying working hours of support staff.
- **Emotional Support:** Online students may lack the emotional support available in physical classrooms, impacting their overall well-being and academic experience.

## **Challenges and Ethical Considerations in Digital Credentialing**

Digital credentialing, while promising numerous

benefits, presents its own set of challenges and ethical dilemmas that need careful consideration. This section explores the multifaceted landscape of digital credentialing, delving into challenges and ethical considerations that higher education institutions and credentialing bodies must navigate.

### ***Ensuring Credibility and Integrity in Digital Credentials***

- i) *Verification Mechanisms:* Robust systems like blockchain enhance digital credential credibility by preventing tampering and ensuring authenticity.
- ii) *Quality Assurance:* Collaboration between institutions and accrediting bodies standardizes processes, upholding academic standards for digital credentials' integrity and value.

### ***Addressing Issues of Equity and Access***

- i) *Digital Divide:* Bridging gaps through technology access, connectivity, and literacy programs ensures equal opportunities for underserved communities in digital credentialing.
- ii) *Affordability:* Offering affordable or free programs and scholarships democratizes access, removing financial barriers for learners in pursuing digital credentials.

### ***Ethical Implications of Digital Credentialing in Higher Education***

- i) *Data Privacy:* Strict adherence to regulations safeguards learners' personal data, ensuring security and confidentiality.
- ii) *Authenticity and Transparency:* Transparent credentialing methods and clear criteria foster trust, enhancing learners' confidence in the process.

### ***Strategies for Overcoming Challenges***

*Global Collaboration:* International partnerships promote knowledge exchange and collective problem-solving.

*Continuous Research and Adaptation:* Ongoing research enables institutions to adapt to emerging technologies and methodologies.

*Educational Outreach:* Outreach programs enhance awareness of digital credential value among learners, educators, and employers.

*Ethics Training:* Integrating ethics education fosters responsibility and integrity in the digital credentialing ecosystem.

### **Future Trends and Innovations**

The landscape of higher education is undergoing a profound transformation, driven by rapid advancements in technology and a growing demand for accessible, flexible, and relevant learning experiences. As we navigate the future of education, several emerging technologies are poised to reshape the way we use credential knowledge and skills.

### **Predictions for the Future of Higher Education Credentialing**

*Micro-Credentials and Stackable Programmes:* The prominence of micro-credentials and stackable programs offers flexible pathways, enhancing employability.

*Global Recognition and Standardization:* International recognition and standardization efforts ensure consistency, enabling seamless acceptance of credentials worldwide.

*Lifelong Learning and Continuous Upskilling:* Lifelong learning and upskilling through digital badges become essential for staying competitive in evolving industries.

### **Policy Implications for Educational Institutions and Governments**

*Regulatory Frameworks:* Governments establish clear, collaborative policies for quality digital credentialing, ensuring accessibility and ethical standards.

*Financial Support:* Governments provide funding, scholarships, and subsidies for digital credentialing initiatives, promoting accessibility and research in credentialing technologies.

### **Recommendations for Educational Leaders and Stakeholders**

*Adaptation and Innovation:* Educational leaders encourage flexible adoption of emerging technologies and pedagogical methods for relevance in digital credentialing.

*Global Collaboration:* Institutions engage globally, sharing diverse perspectives and aligning credentialing programs with international standards through collaborations.

**Transparency and Communication:** Clear communication about credentialing processes with stakeholders ensures trust and understanding among students, employers, and policymakers.

**Research and Development:** Investment in research enhances digital credential effectiveness, enabling data-driven decisions and program relevance.

## Conclusion

In our study of the digital frontier in credentialing, we've unveiled a landscape reshaped by innovation: blockchain, artificial intelligence, and immersive technologies redefine knowledge validation. Exploring digital badges, micro-credentials, and online degrees, we found their potential to bridge accessibility gaps and enhance learning outcomes. Our research contributes a nuanced understanding of these technologies, crucial for creating inclusive and trustworthy educational environments. Looking ahead, ongoing research must delve into societal and economic impacts. Institutions should integrate these technologies thoughtfully, prioritizing digital literacy and ethics, and ensuring equitable benefits. As we navigate this digital frontier, challenges abound, yet so do opportunities. We must uphold integrity, ensuring credentials represent mastery of real-world skills. Together, we embark on a transformative journey where education transcends boundaries, offering boundless opportunities and limitless knowledge pursuit—a future that is accessible, equitable, and profoundly impactful.

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**Editor**

# Faculty Development and Digital Pedagogies in Higher Education: Empowering Educators

Mercia Selva Malar\*

According to Wikipedia, “Digital pedagogy is the study and use of contemporary digital technologies in teaching and learning.” Digital pedagogy may be applied to online, hybrid, and face-to-face learning environments. Oxford University Press defines digital pedagogy as the study of how to teach using digital technologies. Today’s generation being tech-savvy is labeled as the ‘Gen C’, ‘Gen I’, ‘Net Gen’, ‘Gen Y’, ‘Gen Z’, ‘Internet Generation’, ‘digital natives’, etc. Digital natives are those born after 1980 who were raised in an environment in which they were surrounded by technology and who possess technological skills different from those possessed by the members of the prior generation (Palfrey and Gasser, 2013, and Prensky, 2001). In contrast majority of the teachers are not so conversant with the technology and are labeled as ‘digital migrants’. Some teachers make efforts to learn and embrace technology through courses, others take the help of their colleagues or students or children at home and the smart ones have self-taught themselves. Teachers of higher education today are a mixed blend of both digital natives and digital migrants. The students being conversant and comfortable with technology and digital pedagogies becomes essential in higher education. As a part of the teaching community uncomfortable and not very conversant with technology, the need for training in digital pedagogies in higher education becomes crucial. Even now it is not too late to think of empowering educators with digital pedagogies. There is an urgent need to embrace and empower educators at the higher education level in digital pedagogies. Kivunja (2014) emphasized that 21st-century students need 21st-century skills to succeed in their careers and called it the ‘New learning paradigm’. In this context, he answered the questions: what are the skills of the 21<sup>st</sup> century? and how 21st-century skills can be taught effectively to present and future students in higher education to improve their Digital Economy readiness. In response to the question raised he gave the answers through a review of

literature, emphasizing the domain of learning and innovation skills, which can be taught effectively and can empower higher education students towards success, in the knowledge-based digital world.

## Digital Pedagogies: Evolution and Trends

Digital pedagogies have developed over centuries with their roots in distance education (Nanjundasamy et. al. 2021 and Spector et. al., 2008). Over the years they have developed scientifically and technologically. With the advancement in Computer Science, Internet connections, and Technology 4.0, digital pedagogies have become more advanced. Casal and Lopez (2023) mapped the digital pedagogies in higher education. They analyzed through the application of bibliometric analysis and systematic review of scientific output how digital pedagogy evolved and the emergence of trends of research into digital pedagogy in higher education. The sample contained 242 scientific publications, including articles (65.7%), publications published in the United States (17.7%), and publications financed by the European Commission (3.71%). The research with the greatest impact were those conducted during 2020 -2022, the digital pedagogy and its implementation during the COVID-19 situation. The study revealed that digital pedagogy evolved and advanced over the past twenty years but received a great thrust during the COVID-19 situation and is topical now.

## COVID-19 and Digital Pedagogy

COVID-19 made digital pedagogies more imperative and relevant even in developing and underdeveloped economies. With COVID-19 all educational institutions embraced lockdown and enabling education to continue for students at home digital pedagogies received greater thrust and attention. Developed countries were already practicing some form of digital pedagogies even pre-COVID. All across the globe digital pedagogies became more relevant and unstoppable during COVID-19. What could have happened during the next few decades was thrust upon education institutions during the two to three years of COVID-

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19. Teachers and students had to quickly embrace digital pedagogies to overcome the challenges posed by COVID-19 on the education system and education institutions. Several studies have proved that COVID-19 has had the most remarkable impact on digital pedagogies.

Ali (2020) conducted an exploratory study and found the criticality of digital pedagogy during the unforeseen and troubled times of COVID-19. The criticality of digital pedagogy was emphasized, reiterated and justified by the meta-analysis of literature. The study revealed that universities across the globe were moving a significant proportion toward online learning or E-Learning. It was also pointed out that apart from resources, staff readiness, confidence, student accessibility and motivation play crucial roles in ICT-integrated learning.

Anderson (2020) verified the digital pedagogy pivot made necessary by the COVID-19 pandemic and presented the challenges that crept up due to the short-term transition to digital pedagogies which otherwise could have taken a decade. The study reviewed the impact on HRD practice and HE concepts. Kidd and Murray (2020) examined the impact of COVID-19 on teacher education in England and realized the pedagogical agility that happened due to digital pedagogy. This quick shift revealed many newness and oldness in the pedagogy in the innovative digital pedagogies developed locally.

Crawford et.al. (2020) examined the higher education response of 20 countries to COVID-19. The responses were diverse and fully online curriculum. The agility of higher education in response to the pandemic provided great learning for the future. Besette and McGowan (2021) explained how Centers for Teaching and Learning (CTLs) across nations have been continuously responding with support for teaching-learning during the COVID-19 global pandemic. Apart from offering rapid, agile, knowledgeable, and evidence-based instructional development approaches for various courses, they found affective skills such as compassion, empathy, and listening—surfaced as crucial components of educational development during COVID-19.

### **Advantages of Digital Pedagogy**

Røe, Wojniusz, Bjerke (2021) present the advantages of digital technologies in higher

education. Some of the advantages identified by them were: student-centeredness, formative feedback, constructive alignment and flexible infrastructure. Student-centeredness is made possible as digital pedagogies are personalized, flexible, collaborative and creative. Formative feedback is assured in digital pedagogies as the feedback is personalized for each student, flexible according to student requirements and collaborative. Digital pedagogies grant the advantage of constructive alignment through creativity and student-centeredness. The flexible infrastructure of digital pedagogies makes it more flexible, collaborative and creative.

### **Future of Digital Pedagogy**

The future of digital pedagogy is more promising as there are many more technological advancements happening and educational institutions are quickly embracing the technological advancements. With Industry 4.0 there are many developments possible to improve the teaching-learning experiences, research experience, innovation and consultancy of higher education institutions. Digital pedagogy will definitely impact the learners to have an awesome experience in learning.

Chernova, Nemesh and Togachynska (2023) carried out an empirical study involving 216 teachers of Ukraine of pedagogical faculties from different higher education institutions using a questionnaire through Google Forms as a data collection tool. The study revealed the main ideas of the digital approach to education, the key tools to be used in digital learning, outline the key areas in the education of the future and determine the main trend in the digital pedagogy of the future. It also clarified the fact that digital pedagogy is here to stay and coexist with the traditional approach to pedagogy.

### **Faculty Development in the Digital Age**

Faculty development is a much-needed initiative across educational institutions and all across the globe. Change and development of the global economies in terms of Science and Technology is constant. With the change in Science and Technology, the world gets impacted and the education system and the students are impacted. When students are technology and digital savvy there is a great need to improve faculty engagement and empowerment in digital pedagogies. The advancement in digital

technologies is swift and strong. What took decades to change is changing overnight these days. This calls for continuous faculty development in digital pedagogies year after year, month after month. The training for faculty must be carried out by the institutions in their own interest. If institutions drive the faculty development programs then there is a greater possibility that we can equip and empower teachers with digital pedagogies.

Ranieri, Pezzati and Raffaghelli (2017) presented the case of Did-El, a program of faculty development implemented at the University of Florence. The case study was conducted through a collaboration between the Department of Education and Psychology and the Center of Computer Services. They presented the training model and its main components. The faculty development was based on experiential learning and reflective practices. The entire faculty development program was conducted with case studies, multimedia resources for self-learning, sharing in professional learning communities and coaching. This model was proposed to be of great use to future faculty development programs too.

Ranieri, Raffaghelli and Bruni (2019) examined DIDE-L case, a strategic program of faculty development. The program was promoted by the University of Florence and relied on an integrated approach to training. To be specific, it zeroed in on the “e-Learning Desk,” an institutional service ensuring instructional coaching for learning design. It primarily focused on the “e-Learning Desk,” an institutional service ensuring instructional coaching for learning design. Teachers’ reactions and renewed practices, were analyzed to explore and expose what institutional and organizational conditions prevented or facilitated pedagogical innovation and change. It was found that the service had a profound impact on teachers, although organizational obstacles and barriers like lack of support and recognition prevented teachers from committing pedagogical innovation.

Bali and Caines (2018) aspired to connect higher education institutions across nations and across the globe, bringing about social justice, and equity and power differences into consideration. They have presented both their theoretical perspectives and some recent practices that could inspire institutions to take the directions towards

digital pedagogy though of small scale, yet could provide springboards for future approaches. This direction could be applied on a larger scale and would be more fully integrated, supported, recognized, and rewarded in institutions. The study further considered alternative approaches to faculty development that took advantage of the latest advances in technology, such as #DigPINS, Virtually Connecting, collaborative annotation, and dual-pathway MOOCs. The study presented a semi-fictional autoethnography and highlighted the models that can be adapted by institutions in order to achieve professional development that results in more transformative, participatory, and equitable educators.

The various studies carried out have emphasized the need for faculty development in digital pedagogies. The studies also have experimented with various forms of digital pedagogies and have experimented with them. Unless Faculty Development is made a regular feature of educational institutions, they cannot survive the pressure from the institutions offering such a service.

### **Educators’ Actions Required: Empowering Self**

Self-help is the best help. Every educator has a significant role to play in empowering themselves with digital pedagogies. Teachers being life-long learners must embark on the journey of learning digital pedagogies through self-taught modes. Self-help need not be a lonely journey—it can be with a group of others on the same journey of learning digital pedagogies. Faculty Development Programs organized by teachers with digital pedagogies experience can be a wonderful place to begin. There are also online learning resources and books to acquire the required knowledge and skills. Ahuja (2023) highlighted the importance of effective curriculum design for higher education and the role of faculty development programmes in making digital pedagogies. He further explored the challenges faced by the faculty development programs and therefore suggested pedagogical considerations, instructional design, and technological competencies to overcome these challenges. The study examined the best practices in faculty development for online curriculum design, providing practical guidance for faculty members and institutions. The theoretical approach to the study was based on the

theories of heutagogy and self-determined learning, transformative learning, connectivist, and connected learning, and an interest in equity.

Digital technologies for educators to embrace digital pedagogies are not too tough. There are several self-learning methods like apps, YouTube channels, live projects, hands-on experience, etc. The desire to conquer the digital pedagogies should arise from the teachers and they must devise the ways through the right faculty development program. Apart from charting their own path alone, they can build teams that learn together. Further, they can approach the management of the institution where they belong or embrace it from the larger universities they are part of. A consistent watchout for Faculty Development programs definitely helps.

### **Institution Actions Required: Empowering Educators**

Antunes et al. (2021) propounded that institutions should take the initiative to bring the long-lasting changes required in digital pedagogies by promoting changes in teaching practices and educational beliefs among teachers. Børte et al. (2020) emphasized the sudden spurt in technological skills among higher education teachers. Thus, it becomes higher education institutional leaders.

Røe, Wojniusz, Bjerke (2021) suggested the four steps in implementing 'Active Learning Pedagogy' to overcome the barriers to digital pedagogy and to reset the training and education for the digital age. The four steps suggested were: Support student-centered teaching cultures, introduce personalized digital incentive structures, equate the status of research and teaching and Redesign the physical infrastructure.

Damşa et. al. (2015) recommended that teachers must be encouraged to produce their digital material by compensating them financially and permitting them to hold their ownership of all digital material created without the support of the institution. They can be permitted to reuse the material and must be compensated in a reasonable manner. Higher educational institutions must be overwhelmed by the initial cost involved rather must be seen as a long-term investment into effective learning.

Sinclair and Aho (2018) advised to overcome the challenges of cross-learning happening among

teachers and to promote sharing and enabling teachers with best practices must adopt Active Learning Pedagogy with a scientific approach and dissemination of such practices in journals and conferences. The administrative system and academic research network in the organization must be strengthened to achieve this.

Maor (2017) examined the Technology, Pedagogy, and Content Knowledge (TPACK) Model in two higher education e-learning courses in Australia that enhanced students' ability to use technology in their learning and later in their professions. The purpose of the study was to empower the students as reflective learners and create knowledge collaboratively. The outcome of the study revealed that students became confident and conversant in the use of TPACK. The results confirmed that the participants implemented TPACK in their classrooms. It also showed how digital pedagogies can be implemented along with TRACK.

Kivunja (2013) concluded that higher education providers must ensure that teacher graduates are well-prepared to teach effectively to the digital generation. He found that embedding digital pedagogy in the skilling of these teachers was urgently needed to help them appreciate the role of technology in the teaching of pedagogy and content knowledge (TPACK).

Education institutions, Education administrators, Education Entrepreneurs have a significant role to play in making digital pedagogies more accessible and applicable in every classroom. This needs a great investment in teachers to help them embrace digital pedagogies. Through push and pull strategies education institutions and education administrators can do this. Faculty Development Program can be made as a pull strategy and push strategy – pull when made attractive with several benefits attached to it, push when everyone is compulsorily made to attend. Benefits that can attract faculty towards faculty development programs on digital pedagogies could range from promotion, certificates, attractive training destinations, other rewards, etc.

### **Conclusion**

Digital pedagogies are here to stay. Faculty members cannot escape from handling digital pedagogies. It is important that teachers upgrade themselves voluntarily. The cost could be a challenge

for many teachers who would desire to graduate in digital pedagogies. Institutions must invest in the teachers through Faculty Development Programs on digital pedagogies. Faculty development programs are the most powerful ways faculty members can equip and empower themselves. Digital pedagogies as a welcome move in higher education must enable teachers to improve the learning experience and learning outcome of the students, and therefore careful attention of the academic administrators, academic policy makers, and academic administrators.

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# Issues and Concerns of Cyber Safety and Security among Online Students

Jasim Ahmad\*, Aerum Khan\*\* and Khushnuda Bano\*\*\*

Our Hon'ble Prime Minister said, "I dream of a digital India where cyber security becomes an integral part of our National Security". The COVID-19 pandemic has transformed the learning paradigm from conventional traditional classrooms to e-learning/ online classes for some time. After the pandemic the offline classes started again and this alteration from online to offline created an interval in the learning pattern of students at all levels. However, students use the internet for more and more learning. A few schools still practice blended classroom which is a combination of online and offline classes.

Nowadays, children do not use only schoolbooks as the medium of their studies, but they take the support of the internet to gain knowledge and to learn more informative things. That's why parents should not only provide good books to their children but also keep an eye on where and what they visit on the internet. Which search engines and websites do they use; what personal information do they share on different apps and websites; all these things should also be kept in mind. Parents should watch and ward their children not only physically but also virtually.

## The Physical and Virtual World

The physical and virtual worlds are two different atmospheres that have distinct features and implications for humans. The physical world refers to the physical space that we can experience with our senses. It includes our homes, surroundings, neighborhoods, places, and natural environment which is concerned with our activities and interactions, and it can alter our sensibility, understanding, behaviors, cognition, and social norms. Virtual world, on the contrary, refers to the online world of the internet, digital devices, and technologies. It includes various

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applications, conferencing tools, different websites, social media platforms, online communities, and other digital spaces where people can connect, interact, and communicate with others virtually. It provides a platform for global communication, sharing information, exchange ideas, and collaboration, and it allows for anonymity and flexibility in social interactions.

The major difference between the physical and virtual worlds is the level of control and regulation. The physical world is administered and controlled by laws, regulations, and social norms that are governed by institutions such as governments, police, and communities. The virtual world, however, is often less regulated, and users have more control over their interactions and behaviors. This can open the path for both positive and negative outcomes, such as freedom of expression and creativity, but also maximized risk of online harassment, online abuse, cyber bullying, and other forms of online exploitation. Understanding these differences can help us to navigate these worlds more efficiently, effectively, and responsibly.

## Indian Cyber Crime Coordination Centre (I4C)

The Ministry of Home Affairs GOI initiated Indian Cyber Crime Coordination Centre (I4C) in 2018, to take care of Cyber Crime effectively in our country. The chief components of this scheme are:

1. National Cybercrime Threat Analytics Unit.
2. National Cybercrime Reporting Portal.
3. Platform for Joint Cybercrime Investigation Team.
4. National Cybercrime Forensic Laboratory Ecosystem.
5. National Cybercrime Training Centre.
6. Cybercrime Ecosystem Management Unit.
7. National Cyber Research and Innovation Centre.

The Government also launched Cybercrime Reporting Portal to empower citizens to intimate online cases pertaining to Child Pornography (CP)/ Child Sexual Abuse Material (CSAM) or sexually

evident content such as Rape/ Gang Rape (CP/RGR). The national cybercrime reporting portal provides a platform to register any cybercrime. The parents can also report there with a name or anonymously. Different lawyers are working in this field to deal with cyber risk-related issues. For each kind of abuse, there is a different section like 65A, 66B, 66C etc. The I4C proposed to celebrate 'Cyber Jaagrookta Diwas' every month on the first Wednesday, starting from October 6, 2021.

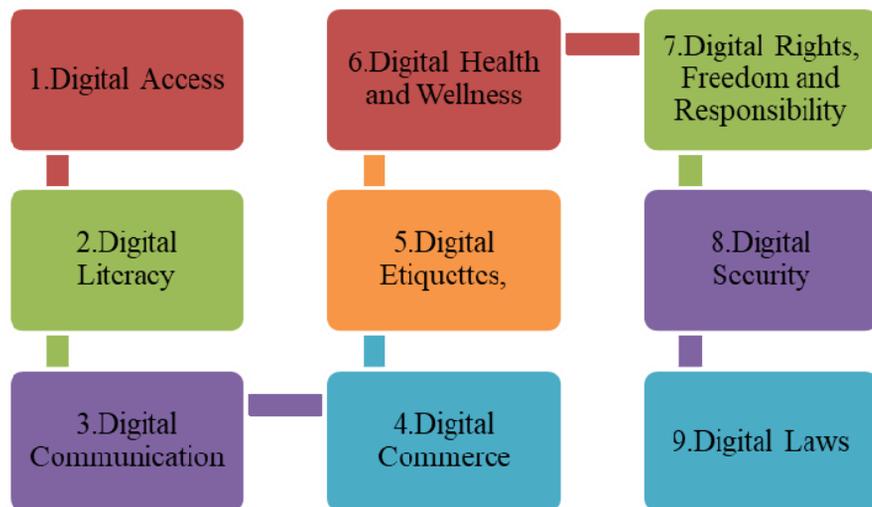
Apart from that the Central Government also has taken measures to disseminate awareness on cyber-crime issues, cyber-related alerts/ advisories, capacity building/ training of law enforcement officers/ judges/ prosecutors, improving cyber forensics facilities, etc. to prevent cyber-crime and expedite investigations. In June 2020, on the pleading of I4C, the Government of India banned 59 Chinese-origin mobile apps. The Law Enforcement Agencies take legal action as per provisions of the law against the reported cyber-crimes (Minister of State for Home Affairs, Shri G. Kishan Reddy minutes in Rajya Sabha).

### Cyber Safety Booklet for Children

A handbook on cyber safety has also been developed by CBSE entitled as "Cyber Safety Booklet for Children". The booklet talks about nine components of digital citizenship, i.e. digital access, digital literacy, digital communication, digital commerce, digital etiquettes, digital health and wellness, digital rights, freedom and responsibility, digital security, and digital laws.

This booklet clearly navigates bits and bytes of cyber space. This directs to secure digital access. This handbook provides guidelines for proper digital literacy and digital communication. This handbook also provides a fair amount of information about digital commerce. Apart from this, this handbook also explains in detail digital etiquettes, digital health, and wellness. There is a detailed description in this booklet about digital rights, freedom and responsibility, digital security, and digital laws. In

FIG-1: Components of Digital Citizenship



the end, there is a checklist that ensures children are smart online. Some useful contacts are also provided at the end of the booklet which can be contacted in case of urgency.

The chief purpose of this booklet is to equip children and young people with modern technologies and digital devices in a smart and safe way. It also makes them aware to be rational for the time spent online.

### A Handbook for Students on Cyber Safety

Ministry of Home Affairs GOI has prepared a handbook for Adolescents/ Students on Cyber Safety in consultation with cyber security experts. The book explains why cyber security is an important concern. The book listed Cyber threats that can impact. The booklet also describes cyberbullying, cyber grooming, online gaming, email fraud, and online transaction fraud. It also led, to how to safeguard social networking profiles. It is remarkable to keep in mind that the digital world transforms each and every day. With this shift, the cases of Cyber Crime also changed in different ways. Therefore, this is the responsibility of every citizen to keep updating themselves with new technologies for safer internet use.

### Cyber Safety and Security: Guidelines for School

CIET NCERT also prepared a booklet entitled "Cyber Safety and Security: Guidelines for School". This book talks about five important things to ensure cyber safety for children.

1. Identify threat vulnerability and assess risk exposure.
2. Develop protection and detection measures.
3. Protect sensitive data.
4. Respond to and recover from cyber security incidents.
5. Educate your stakeholders.

### **Cyber Safety or Online Safety**

Cyber safety and security refers to the safe and responsible use of the Internet along with other digital devices, instruments, various tools, and digital technologies. It is associated with taking measures to protect oneself and others from online risks, such as cyberbullying, identity theft, information hacking, malware, and other forms of online exploitation. Encouraging youth to turn off or avoid technology, however, is an unrealistic and overall ineffective long-term strategy (Hinduja & Patchin, 2009). Technology is universal and now integrated virtually in all aspects of their lives (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013).

### **Safer Internet Day (International Day Celebration)**

This year on 7 February, Safe Internet Day was celebrated. This day is held every year on the second day of the second week of February. The prime focus of this celebration aimed at promoting safe and responsible use of the internet and digital technologies, especially among young people. The day was first celebrated in 2004, and since then, it has become a global event with participation from over 170 countries.

The Safer Internet Day aimed to promote and ensure awareness about online safety issues and encourage best practices for staying safe online. It provides an opportunity for individuals, agencies, and governments to come together and share resources, strategies, and initiatives for promoting online safety. Each year, Safer Internet Day has a different theme, and events and activities are organized around that theme. Past themes have included “Together for a Better Internet” and “Create, Connect, and Share Respect: A Better Internet Starts with You.”

Through Safer Internet Day, individuals and different agencies can help promote a safer, more secure, and more respectful online environment for everyone.

### **Stay Safe Online Campaign**

During India’s G20 Presidency, the Ministry of Electronics and Information Technology is also running a campaign called “Stay Safe Online Campaign” to raise awareness for cyber safety. The notion behind this campaign is to promote cyber awareness of online dangers while also encouraging cyber safety, which will strengthen online security for everyone.

### **Online Abusing or Cyberbullying**

Online abuse refers to noxious, harassing, and injurious behaviors that are directed towards an individual or a group of individuals through digital communication technologies such as social media, instant messaging, email, or online forums. Such behaviors may include threats, insults, derogatory and offensive comments, cyberbullying, stalking, revenge, porn, doxing, or hate speech.

In multiple ways, cyberbullying may be perceived as more dangerous than “offline” (i.e., traditional or schoolyard) bullying because these attacks can be more intense, frequent, unsuspecting, and seemingly difficult to stop (Hinduja & Patchin, 2009). Online abuse can have serious negative consequences for the victims, including emotional distress, anxiety, depression, self-harm, human trafficking, and even suicide. The anonymity and flexible communication on the internet can make it easier for perpetrators to engage in such behaviors and to hide their identities. Online abuse also can potentially be even more cruel than off-line bullies because, in addition to words, they can incorporate as part of their attacks a rich array of media including sounds, altered photos, text, video, slide shows, and polls (Li, 2007, Sabella, 2008).

It can be difficult to know if a child has been abused online, as many children may not report such incidents out of fear, shame, or embarrassment. However, there are some signs and behaviors that may indicate that a child has been abused online. These may include:

- **Changes in Behavior:** If a child suddenly becomes withdrawn, anxious, or depressed, or displays sudden changes in behavior or mood, it may be a sign that something is wrong.
- **Withdrawal from Activities:** If a child suddenly stops participating in activities they previously

enjoyed or withdraws from social situations, it may be a sign that they are experiencing emotional distress.

- **Secretive Behavior:** If a child becomes secretive about their online activities, or seems to be hiding something, it may be a sign that they are being abused or harassed online.
- **Increased Use of Technology:** If a child suddenly starts spending more time online or using their devices in unusual ways, it may be a sign that they are experiencing online abuse or harassment.
- **Physical Symptoms:** If a child displays unexplained physical symptoms, such as headaches, stomachaches, or trouble sleeping, it may be a sign that they are experiencing emotional distress related to online abuse or harassment.

If you suspect that a child is being abused online, it is important to act. This may include talking to the child and offering support and resources, reporting the abuse to authorities or online platforms, and seeking professional help if necessary.

### Need and Rationale of the Study

The paper intends to analyze the cyber safety related issues of students. With the help of this study the teachers, parents, and related institutions may develop awareness towards cyber sensitization. Proper guidance can be provided to the students for their cyber safety so that any kind of mishappening or online bullying can be minimized and handled efficiently.

### Research Questions

What are the issues and concerns of cyber safety and security and how cyber safety can be ensured for students?

### Objectives

1. To study the use of various devices and tools by students during online learning.
2. To study the perception of students towards switching on camera during online learning.
3. To study the cyber-safety issues faced by students.
4. To study the severity of

cyberbullying behavior faced by students.

5. To study the perception of students towards cyber security as an issue.

### Methodology

The Descriptive Survey Research Methodology was adopted. All students of class 10 of schools of South Delhi were the population. The sample consisted of 79 students of class 10 of the Delhi Government and private schools in South Delhi. The sample was drawn randomly. The sample includes 36 boys and 43 girls. Self-constructed tools were used which were validated by different experts. The researcher randomly selected the school first and then approached the principal of the school and explained briefly the purpose of the study. After seeking their permission, the researcher approached the class teacher, and with their consent and help the tool was distributed in the class. The researcher explained and introduced them briefly. After some time, the tool was collected from students. The data was analyzed using quantitative as well as qualitative techniques. The study was delimited to the secondary-level students of South Delhi. The study was conducted in Delhi government schools and private schools of South Delhi.

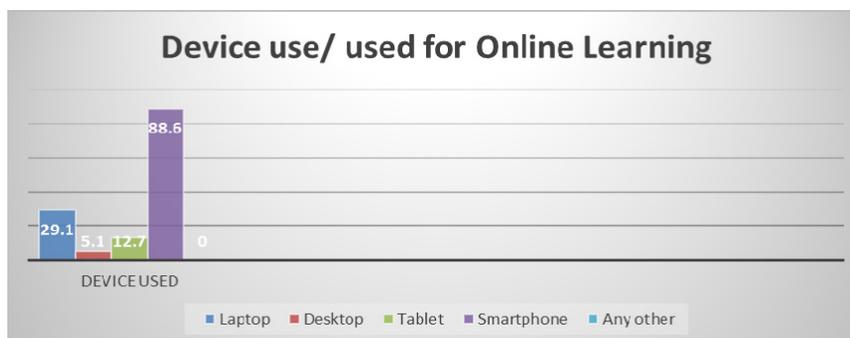
### Results and Discussion

The findings of the study are discussed hereinafter.

#### Findings for Objective -1

Figure 2 indicates that the smartphone is the most popular device for online classes used by students. The study reveals that 88.6% of students used smartphones for online classes. The next popular device is a laptop after a smartphone. Which is used by 29.1% of students.

FIG-2: Device Used



**FIG-3: Conferencing Tool Use/ Used**

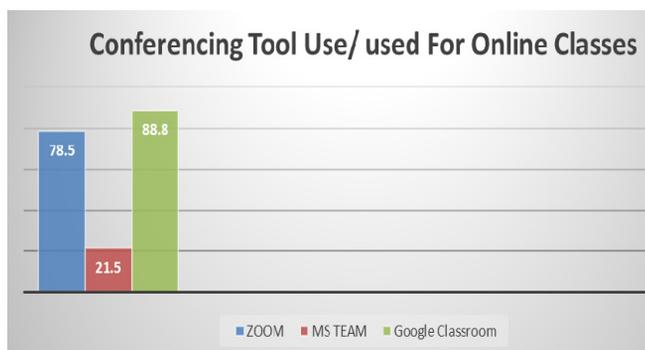


Figure 3 indicates that Google Classroom was the most popular and used conferencing tool for online classes. Data reveals that 88.8% of students used Google Classroom for their online classes. ZOOM is another popular conferencing tool, which was used by 78.5% of students for their online learning. Very few 21.5% of students used MS Team.

**Table -1: Use of Various Devices and Tools by Students During Online Learning**

Device used for Online Learning	Frequency	Percentage
Laptop	23	29.1%
Desktop	4	5.1%
Tablet	10	12.7%
Smartphone	70	88.6%
Conferencing Tool Used for Online Classes	Frequency	Percentage
ZOOM	62	78.5%
MS TEAM	17	21.5%
Google Classroom	70	88.8%

Table 1 shows the frequency and percentage of the devices and tools used/ used by students during online learning.

**Findings for Objective -2**

Fig-4 indicates that 53% of students never or rarely used their camera while learning online. Only 6% of students reported that they always switched on their camera.

**Table-2: Camera Switched on in Online Classes**

Camera On	Frequency	Percentage
Always	5	6%
Frequently	14	18%
Occasionally	18	23%
Rarely	27	34%
Never	15	19%

**FIG-4: Switching on Camera**

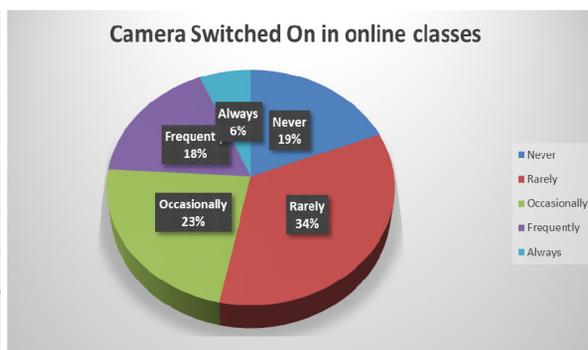


Table 2 depicts the frequency and percentage of students. The findings of this objective reveal that more than half of the students rarely switched on their cameras in online classes.

**Findings for Objective -3**

To study the cyber-safety issues faced by students.

Figure 5 reveals the cyber risks/ issues faced by students while learning online. Online mishapening/ online bullying/ online harassment issues faced by 33% of students.

**Table -3: Cyber Safety Issue Faced**

Cyber Safety Issue faced	Frequency	Percentage
Yes	26	33%
No	53	67%

They reported online bullying or faced cyber safety-related issues in online classes ranging from less severe behavior to more severe behavior. From Table 3, this is apparent that 33% of students faced cyber safety-related issues and were affected by cyberbullying while learning online.

Findings suggest that there is an immediate need to promote awareness of cyber safety among students and teachers. Also, there is a need for training for students and teachers for safe and responsible use of the internet.

**Findings for Objective -4**

To study the severity of cyberbullying behavior faced by students.

Fig-6 indicates students reported online bullying or faced cyber safety-related issues in online classes ranging from less severe behavior to more severe behavior.

**Table -4: Severity of Cyber Bullying**

Severity of Cyber Bullying	Frequency	Percentage
Less Severe Behavior	23	29%
More Severe Behavior	3	4%

Table 4 reveals Less severe behavior faced by 29% of students like offensive names, and purposeful embarrassing behavior. More severe behavior related to the cyber world is also faced by 4% of students.

**Table 5: Less Severe Behavior of Cyber Bullying**

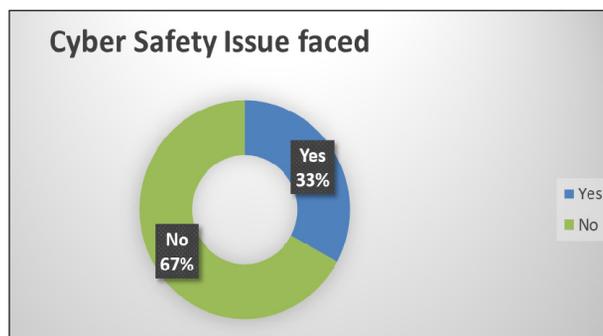
Behavior Identified	Frequency	Percentage
1. Offensive name	16	20.25%
2. Entry of unknown ID with suspicious name and account in online classes	23	29.11%
3. An unknown person with a fake account entered and wrote inappropriate words in the chat box	18	22.8%
4. A person with a fake account entered off-camera and starts making weird voices in the background or playing a song	7	8.9%
5. An unknown person shared their screen with irrelevant video of contents	14	5%
6. Unknown ID with suspicious name and account remove other students from online class	19	24%
7. Student missed a few classes	12	15.2%

**Table 6: More Severe Behavior of Cyber Bullying**

Behavior Identified	Frequency	Percentage
1. ID was hacked, and the hacker joined the class with the student's name and started abusing in classroom	2	2.5%
2. The password was hacked, and the hacker started sending weird messages to their friends and teachers	2	2.5%
3. The student was removed while giving answers to the teacher.	1	1.2%

Table 5 enlisted the frequency and percentage of students who faced behavior identified as less severe

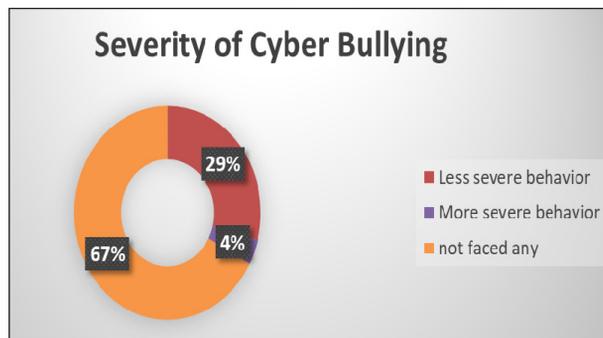
**FIG-5: Cyber Safety Issues Faced**



behavior. 29.11 % of Students reported occasional entry of unknown ID with suspicious name and account in online classes. 22.88% of students reported that an unknown person with a fake account entered and wrote inappropriate words in the chat box. 8.9% of students reported that a person with a fake account entered off-camera and started making weird voices in the background to play songs or shared their screen with irrelevant videos or content. 24% of students reported that unknown IDs with suspicious names and accounts remove other students from online classes. Once a student was removed while giving answers to the teacher. 15.2% of students missed a few classes because an unknown person removed them.

Table 6 enlisted the frequency and percentage of students who faced behavior identified as more severe behavior. 2.5% of students reported that their password was hacked, and the hacker started sending weird messages to their friends and teachers, so the students immediately informed their school administration and changed the password, Id, etc. 1.2% of students also reported that unknown id in classroom removed him while giving answers. It was very stressful for the students who missed classes. 2.5% of students reported that their id was hacked, and a hacker joined the class with the student's name and started abusing in the classroom. The student was affected badly.

**FIG-6: Severity of Cyber Bullying**



## Findings for Objective -5

To study the perception of students towards cyber security as an issue. Students consider cyber safety and security to be an issue to deal with.

Fig-7 indicates that 46% of students consider cyber safety as a major issue. 34% consider cyber safety as a minor issue. 20% consider this not an issue.

**Table 7: Cyber Security as an Issue**

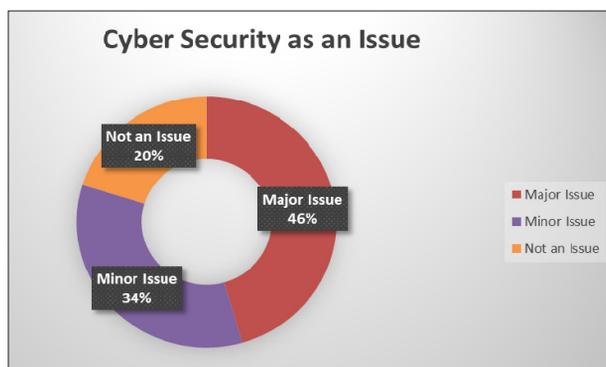
Cyber Safety as an issue	frequency	percentage
Major issue	36	46%
Minor issue	27	34%
Not an issue	16	20%

Table 7 shows the frequency and percentage of students who consider cyber safety as an issue. Thus, it can be interpreted that most students were affected by cyber risks and were aware of their concerns while learning online.

## Educational Implications

The findings of this study suggest that there is an immediate need to initiate efforts to strengthen cyber safety and security. Teachers should try to monitor online classes carefully and restrict entry to specific and limited users. The result of this study suggests promoting awareness of cyber safety among students, teachers, and parents. There are few applications for parents to have an eye on the activity of their ward on the internet. For example, Google Family link for Android and custodial parental control for iOS. The findings of the study have implications for cyberbullying which is very impactful and must be addressed from the victim's point of view. There are also provisions for legal actions against cybercrime. In paragraph 8.11 of the National Education Policy–2020, it is emphasized how important it is to provide children and adolescents' rights and safety top priority.

**FIG-7: Cyber Security as an Issue**



The policy emphasizes the creation of trustworthy reporting channels to notify and handle any violations or infringements against children's and adolescents' rights and safety, providing transparent and effective procedures. The findings of the study suggests that teacher, school, and parents to be watchful and supportive of their children, not only physically but also virtually. Findings also suggest some guidelines for parents to minimize cyber risks.

## Conclusion

Cybercrimes are increasing day by day in our country. Cyberbullying is a complicated and serious issue for victims. There are also provisions for legal actions against cybercrime. The present study reveals that cyberbullying targets and methods may differ based on the age and gender of the victim. Individuals and different agencies can help to promote a safer, more secure, and more respectful online environment for everyone.

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# Streamlining Digital Library Services: Harnessing the Potential of ChatGPT to Amplify User Experiences

Pramod Kumar Hota\* and Lopamudra Hota\*\*

Conversational AI has emerged as a powerful technology with the potential to transform library services. This paper presents an overview of ChatGPT, an advanced language model designed to enhance the library experience by providing intelligent and interactive conversational capabilities. ChatGPT serves as a virtual librarian, capable of engaging in natural language conversations with library users. It offers a wide range of functionalities, including answering questions, assisting with research inquiries, recommending resources, and providing personalized learning support. By leveraging its extensive training on diverse text sources, ChatGPT demonstrates an impressive understanding of a broad spectrum of topics. It can address queries across various disciplines, guiding users to relevant resources and offering expert-like assistance. Its ability to generate coherent and contextually relevant responses enables seamless interactions and fosters a user-friendly experience. In addition to its information retrieval capabilities, ChatGPT excels in personalized learning support. It can offer tailored study guides, suggest learning materials aligned with users' interests, and facilitate language learning through interactive practice. With its conversational nature, ChatGPT enhances the accessibility and convenience of library services, enabling users to engage in self-paced learning and obtain immediate assistance. The paper focuses on the contribution of ChatGPT to creating a personalized learning environment within the library. It can tailor its responses based on user preferences, learning history, and academic goals. By providing customized study guides, offering language learning support, and facilitating study group interactions, ChatGPT fosters a more engaging and effective learning experience. The paper also presents the applications, use cases, and challenges of ChatGPT implementations in libraries. As libraries incorporate ChatGPT, it is important to

address ethical considerations, including ensuring the accuracy of information provided and managing potential biases. Libraries must also prioritize user privacy and establish transparent communication about the AI nature of ChatGPT to manage user expectations effectively.

ChatGPT is an advanced language model developed by OpenAI. It belongs to the GPT (Generative Pre-trained Transformer) family of models and is specifically based on the GPT-3.5 architecture [1]. It has been trained on a massive amount of text data to generate human-like responses to natural language prompts. The model's main strength lies in its ability to understand and generate coherent and contextually relevant text. It can comprehend a wide range of topics, engage in conversations, and provide informative and sometimes creative responses. ChatGPT has demonstrated impressive language understanding and can generate human-like text with remarkable fluency [2].

ChatGPT's training process involves unsupervised learning on a diverse dataset from the internet, allowing it to learn patterns, grammar, and information present in the text corpus. The model employs a transformer architecture, which enables it to process and generate text efficiently by attending to various parts of the input sequence simultaneously [3]. One notable aspect of ChatGPT is its generative nature. It does not retrieve pre-existing responses from a database but generates novel text based on the context and prompt it receives. This allows for more dynamic and interactive conversations with users.

Moreover, ChatGPT also has certain limitations. It can sometimes produce incorrect or nonsensical responses, be sensitive to slight changes in input phrasing, and struggle with complex or nuanced queries. The model may lack deep domain-specific knowledge and can occasionally exhibit biases present in the training data. These limitations necessitate careful monitoring and

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human supervision when deploying ChatGPT in real-world applications. OpenAI has made efforts to balance the benefits and risks of models like ChatGPT, promoting responsible AI use. They provide guidelines to avoid generating harmful or misleading content and are committed to ongoing research and development to improve the model's capabilities and address its limitations. ChatGPT represents a significant advancement in natural language processing and has various applications in conversational agents, customer support, content generation, and other text-based tasks where human-like interaction is desired.

ChatGPT can play a valuable role in educational libraries by enhancing the learning experience, providing personalized support, and facilitating access to educational resources. The implications of AI technologies like ChatGPT and DALL-E for academic libraries are the most focused areas for librarians and information professionals, like the way they alter the practices and aid in better serving and addressing the needs of students in the twenty-first century [4]. ChatGPT can be used to generate ideas or make some steps of the process simpler. It can produce keyword lists, provide work summaries, and aid in subject generation. Soon, ChatGPT will allow you to contribute your text and request an abstract from it. ChatGPT might be able to compile a bibliography of pertinent sources on your subject if it can be integrated with library discovery tools. In the future, AI technologies might work as research assistants, running computer simulations, analyzing data, writing, and revising content, and creating citations. Like ChatGPT, librarians have received training in understanding what users mean by the queries they ask. Libraries currently utilize AI chatbots to respond to simple reference questions and direct more complex ones to librarians [5]. Simply put, ChatGPT is an expansion of the existing service. By offering advice on how to formulate the best queries, librarians may help researchers. Additionally, these technologies provide librarians more time to concentrate on harder research jobs or queries. Additionally, they offer round-the-clock assistance, meeting a demand that librarians may not always be able to. The simplicity with which ChatGPT may provide research-related answers may alter the way we teach. Essay assignments and factual understanding tests will not be used as the

only means of assessment; instead, more difficult assignments related directly to the course's subject matter will be necessary. It can also be beneficial to incorporate more immersive and active learning activities into the curriculum, especially if assignments include infographics, podcasts, or videos. Academic libraries currently offer these kinds of services and areas for learning possibilities. Librarians can collaborate with teachers to develop these assignments. Syllabi, model lesson plans, and the text for a LibGuide can all be quickly generated by ChatGPT. Some have even proposed that ChatGPT serves as the graduate assistant to a class, helping students with tutoring needs [6]. Ideas for using ChatGPT in the classroom may be found on websites like the Sentient Syllabus and "Understanding AI Writing Tools and their Uses for Teaching and Learning" from the University of California-Berkeley.

The development of Open Educational Resources (OER) by academics is a major focus for academic libraries. ChatGPT can write textbooks that used to take a year to write in hours in response to a series of questions. The final material will need to be edited and amended to ensure the quality and accuracy of the information. More free textbooks will be available to teachers if the time it takes to generate OERs is sped up, allowing them to select and adapt them to courses, improving their teaching and helping students save thousands of dollars. Information literacy and digital literacy will become more crucial than ever thanks to AI tools like ChatGPT and DALL-E. In order to confirm facts, assess the quality of ChatGPT's responses, or establish whether a Matisse artwork is actually by Matisse or AI-generated art in his style, librarians can help teachers educate children's critical thinking skills. Teaching students and staff information literacy skills will enable them to make educated judgments through a critical examination of what is given, even though it may be challenging to distinguish between a work produced or created by a student vs. a bot. ChatGPT and other AI technologies, in the opinion of Anand Rao, chair of the Department of Communications and Digital Studies at the University of Mary Washington in Virginia, will "change the nature of knowledge production itself." ChatGPT can generate a rough draught of text that can serve as inspiration for

your work rather than beginning from nothing. DALL-E can produce fresh, motivational art that can be imported into photo editing software like the Adobe Creative Suite and modified to produce unique pieces of art. The same is true when using ChatGPT to compose music and lyrics [4]. Additionally, ChatGPT can “assist developers in writing better code at a faster clip.” When it comes to determining authorship or commercializing the results of AI tool inquiries, ethical issues are at stake. Students who submit work from ChatGPT as their own, according to faculty, are plagiarizing. According to the definition of plagiarism, it means “presenting someone else’s work or ideas as your own, with or without their consent, by incorporating it into your work without full acknowledgment.” No, ChatGPT is not “someone.” Should students include ChatGPT in their citations or list them as co-authors? Academic magazines like Nature are concerned about how AI technologies undermine open science, in addition to concerns about students submitting papers created using ChatGPT.

Who owns the copyright to an AI-created property is the subject of a heated discussion. The news is rife with reports of authors who published books on Amazon that were composed of text and graphics produced by artificial intelligence. Entrepreneurs commission DALL-E to produce art, which is then added to online catalogs and sold for a profit as canvas prints. These so-called “authors” assert that they have a right to the final product’s copyright because they asked the AI tool questions. Some assert “fair use.” The US Copyright Office received a request from David Wiley, the chief academic officer of Lumen Learning, “seeking to register computer-generated work as a work-for-hire to the owner [7].” Using AI techniques, librarians can increase their productivity in various ways. ChatGPT may create emails that encourage faculty members to use the library’s e-reserve service, like a cold call. It can provide a list of books or read-alikes for a thematic display [8]. AI queries can be used to generate news releases, event posters, and other marketing materials. The possibilities for how AI tools may speed up and simplify writing and image creation seem endless. Like any product, AI technologies are susceptible to bias based on the reliability of their data sources or the biases of their designers. Librarians might advise students to

be mindful of any biases in ChatGPT’s responses. Concerns about the future of this product are raised by OpenAI’s present monetization of ChatGPT, which offers a paid “pro” version promising more dependable access and quicker response times. A model like that might result in a knowledge exchange where some can afford it and those who can’t.

## **Evolution of AI-tools in Digital Libraries**

The evolution of AI tools in digital libraries has been significant, transforming the way users interact with and access information. AI tools in digital libraries continue to evolve, driven by advancements in AI technologies, user demands, and the need for efficient information management. As AI progresses, we can expect further innovations and the integration of more sophisticated AI tools in digital library services [9]. The key stages in the evolution of AI tools in digital libraries include:

### ***Search Engines***

Search engines were among the earliest AI tools used in digital libraries. They employed basic AI techniques to index and retrieve information from vast collections, allowing users to search for specific resources or keywords within the library’s holdings.

### ***Recommendation Systems***

With the growth of digital libraries and increasing volumes of content, recommendation systems emerged to help users discover relevant resources. These systems utilized AI algorithms to analyze user preferences, browsing history, and content similarities to provide personalized recommendations for books, articles, or other materials.

### ***Natural Language Processing (NLP)***

NLP became a fundamental AI technology in digital libraries. It enabled the processing and analysis of natural language queries, allowing users to interact with library systems using their own words rather than predefined search terms. NLP facilitated more conversational and intuitive interactions, improving the user experience.

### ***Chatbots and Virtual Assistants***

The integration of chatbots and virtual assistants in digital libraries brought a new level

of user engagement and support. These AI tools utilized NLP and dialogue management techniques to interact with users, provide information, answer questions, offer recommendations, and assist with various library services [10].

### ***Content Generation***

AI tools started to play a role in content generation within digital libraries. Text generation models, like ChatGPT, could produce informative summaries, abstracts, or annotations for resources, facilitating quick understanding and efficient content browsing.

### ***Knowledge Graphs and Semantic Search***

AI technologies, such as knowledge graphs and semantic search, enhanced the organization and retrieval of information in digital libraries. These tools utilized AI techniques to establish meaningful relationships between different resources, enabling more intelligent search capabilities and context-aware recommendations.

### ***Data Mining and Text Analytics***

AI tools, including data mining and text analytics, have been instrumental in extracting insights and patterns from large volumes of textual data in digital libraries. These tools help identify trends, correlations, and patterns that can inform collection development, user behavior analysis, and other library management tasks.

### ***Machine Learning and Predictive Analytics***

Machine learning and predictive analytics have found applications in digital libraries, enabling the analysis of user behavior, resource usage patterns, and library operations. These tools can identify usage trends, predict resource popularity, optimize resource allocation, and support evidence-based decision-making.

### **Some of the Highlighted Applications of ChatGPT in Digital Libraries**

The application of ChatGPT in digital libraries can bring several benefits and enhance the experience of librarians and users. Implementing ChatGPT in a digital library requires careful consideration of user privacy, and data security, and ensuring appropriate disclaimers about the model's

limitations. While ChatGPT can provide valuable assistance, it should be used as a complement to human librarians and not a replacement for their expertise and guidance.

### ***Virtual Reference Services***

ChatGPT can serve as a virtual reference librarian, providing immediate assistance to users' queries. Users can ask questions about finding specific resources, research guidance, citation formats, and more. ChatGPT can offer relevant answers and help users navigate through the library's digital collections.

### ***Recommender Systems***

ChatGPT can analyze users' preferences, browsing history, and reading habits to offer personalized recommendations for books, articles, journals, or other resources available in the digital library. It can suggest related materials based on the user's interests, creating a tailored reading experience.

### ***Search Assistance***

Searching for specific information within a vast digital library can be challenging. ChatGPT can assist users in formulating effective search queries, provide suggestions for refining search terms, and offer tips on using advanced search features. It can help users uncover hidden gems within the digital library's collections.

### ***Content Summarization***

Digital libraries often contain lengthy documents, research papers, or articles. ChatGPT can summarize the content, providing users with concise overviews and key points. This feature can save users' time by providing them with a quick understanding of the material's relevance before diving deeper [12].

### ***Language Support***

Digital libraries cater to users from diverse linguistic backgrounds. ChatGPT can be trained in multiple languages, enabling it to assist users in their preferred language. It can provide support for searching, recommendations, and answering queries in different languages, thereby expanding access to library resources.

### ***Interactive Learning Experiences***

ChatGPT can engage users in interactive learning experiences within the digital library. It can provide quizzes, interactive tutorials, or guided learning paths, allowing users to deepen their understanding of specific subjects or learn new skills using the library's resources [13].

### ***User Engagement and Feedback***

ChatGPT can be used to gather user feedback, suggestions, and ratings for library resources. It can act as a feedback mechanism, enabling users to express their opinions, report issues, or request additional features. This feedback can help digital libraries improve their services and enhance user satisfaction.

### ***Use-Cases of ChatGPT in Educational Libraries***

ChatGPT can be a valuable tool in educational digital libraries, offering various use cases to enhance the learning experience and support users. When implementing ChatGPT in educational digital libraries, it's essential to address considerations such as data privacy, accuracy of information, appropriate content filtering, and ongoing monitoring to ensure that the system provides reliable and safe educational resources to users. Additionally, combining ChatGPT with human expertise can create a comprehensive learning environment that leverages the strengths of both AI and human interactions [11]. Some of the use cases are:

#### ***Personalized Learning Support***

ChatGPT can serve as a virtual tutor or learning assistant within the digital library. It can answer questions, provide explanations, and offer guidance on specific topics or concepts. Users can receive personalized support tailored to their individual learning needs and pace.

#### ***Content Recommendations***

ChatGPT can analyze users' preferences, learning history, and interests to recommend relevant educational resources within the digital library. It can suggest books, articles, videos, or other materials that align with users' learning goals, helping them discover new content and expand their knowledge.

#### ***Study Guides and Tutorials***

ChatGPT can generate study guides, tutorials,

or interactive learning materials based on user queries. It can provide step-by-step explanations, examples, and practice exercises to help users grasp complex subjects or improve their skills in specific areas.

#### ***Research Assistance***

ChatGPT can assist users in conducting research within the digital library. It can offer guidance on effective search strategies, recommend databases or sources, and help users refine their research questions. Additionally, it can provide citation formats and bibliographic information for academic papers and resources.

#### ***Language Learning Support***

ChatGPT can aid language learners within the educational digital library. It can help users practice vocabulary, provide sentence translations, offer grammar explanations, and engage in language conversations. This feature can be particularly useful for users seeking to improve their language skills in a self-paced environment.

#### ***Educational Game Interactions***

ChatGPT can integrate with educational games or learning platforms within the digital library. It can provide hints, explanations, or feedback during game interactions, fostering a more interactive and engaging learning experience.

#### ***Study Group Facilitation***

ChatGPT can facilitate virtual study group interactions within the digital library. It can help coordinate schedules, suggest discussion topics, and provide additional resources or references based on the group's learning objectives.

#### ***Career and College Guidance***

ChatGPT can offer guidance on career choices, college selection, and educational pathways. It can provide information about different careers, admission requirements, scholarships, and other relevant resources within the digital library.

### ***Challenges and Limitations Do ChatGPT Face in Providing Digital Library Services***

While ChatGPT can be a valuable tool for providing digital library services, it also faces several challenges and limitations. To mitigate

these challenges and limitations, digital libraries can implement strategies such as regularly updating and fine-tuning the ChatGPT model, providing clear disclaimers about its limitations, integrating human assistance options alongside the AI model, and actively gathering user feedback to identify areas of improvement [14]. The collaboration between AI and human librarians can help provide more accurate, reliable, and personalized digital library services. Some of these challenges include:

### ***Accuracy and Reliability***

ChatGPT's responses are generated based on patterns and examples in its training data. While it can provide helpful answers, there is a possibility of incorrect or unreliable information being generated. ChatGPT might not always understand the context correctly or provide accurate responses, especially when dealing with complex or nuanced queries related to specialized fields or specific resources.

### ***Lack of Domain Expertise***

ChatGPT is a general-purpose language model and may not possess deep domain expertise in specific subjects. In a digital library setting, where users may have complex research inquiries or require in-depth knowledge, ChatGPT's responses may not be as comprehensive or accurate as those of a subject matter expert. It may struggle to provide nuanced or specialized guidance in certain areas.

### ***Limited Understanding of User Intent***

ChatGPT may have difficulty understanding the precise intent behind a user's query. It can misinterpret ambiguous or poorly phrased questions, leading to inaccurate responses or misunderstandings. This limitation can be particularly challenging when users require specific information or have complex research needs that require detailed guidance.

### ***Lack of Contextual Awareness***

ChatGPT lacks contextual awareness beyond the current conversation. It does not have a memory of previous interactions, which can limit its ability to provide consistent responses over extended conversations. Users may need to repeat or rephrase their queries, leading to a less seamless user experience.

### ***Ethical and Bias Considerations***

ChatGPT may generate biased or inappropriate

responses due to biases present in its training data. Digital libraries need to be cautious about potential biases in the model's outputs, especially when it comes to sensitive topics or underrepresented groups. Careful monitoring, bias detection, and mitigation strategies are necessary to ensure fair and inclusive digital library services [15].

### ***Handling Ambiguity and Vague Queries***

ChatGPT may struggle with ambiguous or vague queries that lack sufficient context. It may either produce irrelevant responses or request clarifications from users, leading to a less efficient user experience. Digital libraries should provide clear instructions and examples to help users formulate more precise queries and maximize the effectiveness of ChatGPT's responses.

### ***User Privacy and Data Security***

ChatGPT operates by processing user queries and interactions, which may involve sharing personal or sensitive information. Digital libraries must have robust data protection measures in place to ensure user privacy and comply with relevant data protection regulations.

It is important to note that while ChatGPT can provide valuable support, it is not a substitute for human educators and librarians. Human oversight is necessary to ensure the accuracy of information, address complex queries, and provide individualized guidance when needed. Additionally, privacy and ethical considerations should be taken into account when deploying ChatGPT in educational library settings to protect user data and ensure responsible AI usage [16].

### **Conclusion**

ChatGPT represents a groundbreaking advancement in conversational AI for library services. By harnessing its capabilities, libraries can provide personalized, round-the-clock support, extend their reach to a wider audience, and empower users to explore and access knowledge more engagingly and interactively. ChatGPT revolutionizes the library experience, positioning libraries at the forefront of innovative information services in the digital era. Embracing ChatGPT in library services represents an exciting opportunity to adapt to the changing digital landscape and meet the evolving needs of users. By

incorporating this conversational AI tool, libraries can enhance user engagement, provide personalized support, and position themselves as dynamic hubs of knowledge and learning in the digital age. ChatGPT empowers libraries to deliver innovative, user-centric services and reinforces their essential role in facilitating access to information and fostering lifelong learning. While ChatGPT offers immense potential, libraries must address ethical considerations, potential challenges, and limitations. Libraries must ensure the accuracy of the information, mitigate ambiguity, protect user privacy, and need domain experts to establish clear communication about ChatGPT's capabilities and limitations to manage user expectations effectively.

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**Editor**

# Open Educational Resources in Higher Education

Anandam Durgaprasad\*

Open Educational Resources (OER) are teaching and learning materials that you may freely use and reuse at no cost, and without needing to ask permission. Unlike traditional copyrighted resources, OER has been authored or created by an individual or organization that chooses to allow for re-use and adaptation of their work. The term “Open Educational Resources” first came into use at UNESCO’s “Forum on the Impact of Open Course Ware for Higher Education in Developing Countries” in 2002. According to UNESCO, Open Educational Resources are defined as “technology-enabled, open provision of educational resources for consultation use and adaptation by the community of the users for non –commercial purposes”.

They are the teaching, learning, and research materials in any medium that resides in the public domain and have been released under an open licence that permits access, use, repurposing, reuse, and redistribution by others with no or limited restrictions. The use of open technical standards improves access and reuse potential. OER can include full courses/ programmes, course materials, modules, student guides, teaching notes, textbooks, research articles, videos, assessment tools, and instruments, interactive materials such as simulations and role play, databases, software, apps (including mobile apps) and any other educationally useful materials. The term ‘OER’ is not synonymous with online learning, eLearning, or mobile learning. Many OER — while shareable in a digital format — are also printable. Open Licence: An open license is a standardized way to grant permission and to state restrictions to accessing, using, repurposing, reusing or redistributing creative work (whether sound, text, image, multimedia, etc.).

## Importance of Open Educational Resources

Open Educational Resources (OER) are freely accessible, openly licensed documents and media that are useful for teaching, learning, and assessing as well as for research purposes. It is the leading trend in distance education/open and distance

learning domains as a consequence of the openness movement. OER is often linked to open access (OA), to online learning, and to open education, OA refers to research outputs that are distributed online and free of cost or other (major) barriers, while OER has a focus on educational purposes. However, one could argue that they both share the motivation of making access to knowledge free of barriers.

- OER has a strong link to online learning. Although OER does not only come in a digital format, information technologies have been essential to the growth and spread of the movement.
- OER is a key part of open education, which relies on these materials to achieve the goal of giving broader access to more effective learning and training opportunities. This applies as much to formal education systems as to informal learning. However, open education is a much broader concept that also looks into other aspects of the learning experience.

## Review of Literature

Pinfield (2005) has explained OA as costless, instant, and unhindered content availability. Open Access is meant basically to serve the purpose of making the intellectual work available on a free accessible platform without any hindrance. OA movement is a modern way of communication in the scholarly world all over the world.

As per Wani, Gul and Rah, (2009), there are many platforms by which information is available and accessible free of cost. Directory of Open Access Repositories (DOAR), Open source software, Directory of Open Access Journals (DOAJ ), and Open Educational Resources (OER) are a few initiatives that make open access practically possible. Open Educational Resources are considered the best for the purpose of making information accessible quickly and anytime. According to the William and Flora Hewlett Foundation, “OER are the teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software,

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and any other tools, materials, or techniques used to support access to knowledge”. The present study is an attempt to provide insight into various higher education OER initiatives in India.

According to the Organization for Economic Co-operation and Development (OECD),” open educational resources are digitized materials offered freely and openly for educators, students, and self-learners to use and reuse for teaching, learning, and research. OER includes learning content, software tools to develop, use, and distribute content, and implementation resources such as open licenses” (OECD, 2007).

### Need for Open Educational Resources

Open educational resources (OER) are materials used to support education that may be freely accessed, reused, modified, and shared. Their purpose is to encourage decision-makers in governments and institutions to invest in the systematic production, adaptation, and use of OER and to bring them into the mainstream of higher education in order to improve the quality of curricula and teaching and to reduce costs.

### Use of Open Educational Resources

OER can provide democratic and equitable access to knowledge, meaning that anyone can access and use the resources regardless of income level, as long as there are no technical barriers. Public education should not leave unresolved the problem of the affordability of textbooks, which leaves some students without access to a key part of their learning process.

Given the sometimes high and unaffordable cost of textbooks, OER offers a solution for those faced with economic restrictions.

OER can support life-long and non-formal learning, by being available to people outside of the formal educational system, regardless of age and previous studies.

OER can offer more diversified knowledge than traditional textbooks. Through OER, materials come from many different sources, and different regions, reflect multiple perspectives, and are available in many different languages.

OER can also create a more dynamic experience for the learner, who instead of passively listening or

reading, can take part in the creation of educational resources.

The possibility for others to review work and make corrections or improvements is also a means of increasing the quality and relevance of the materials. Furthermore, when sharing something online, its creators also tend to put a bigger effort into ensuring its quality given that their exposure will be wider.

OER generally allows for reuse, enabling others to adapt good ideas for their own contexts. Other educators can find, and transform material using local examples and references, and use and share it themselves.

Through OERs, one can:

**Retain** : make, own, and control a copy of the resource (e.g., download and keep own copy)

**Revise** : edit, adapt, and modify a copy of the resource (e.g., translate into another language)

**Remix** : combine original or revised copy of the resource with other existing material to create something new (e.g., make a mashup)

**Reuse** : use original, revised, or remixed copy of the resource publicly (e.g., on a website, in a presentation, or in a class).

**Redistribute**: share copies of original, revised, or remixed copies of the resource with others (e.g., post a copy online or give one to a friend).

Librarians support OER by:

- Encouraging their creation and use
- Ensuring their availability, accessibility, and visibility
- Curating and ensuring its quality
- Advising on copyright matters
- Training users' ICT skills and encouraging digital literacy

In India, E-Content initiations Set up in 1993, by University Grants Commission (UGC) as one of its Inter-University Centre, the Consortium for Educational Communication (CEC) provides an educational programme (Audio/Visual and Web-Based) and related support material for a wide range of disciplines. Four major components of this initiative include e-education, EMRC (Media Center),

VYAS and DTH Higher Education Channels, and e-knowledge Resources. These present a new idea and platform for the dissemination of information. In the present era, India has taken several steps for the development and welfare of OERs in India. The Government of India via the National Knowledge Commission understood the role of OER in enhancing quality education and access to it in the country. The National Mission on Education through Information and Communication Technology under the canopy of the Ministry of Education is an efficient step for the enhancement of OER in India.

Open Educational Resources (OERs) are the resources available in the public domain with an open license. OERs fulfill the true aim of education, by democratizing learning and reaching out to those who cannot afford or access them.

### **OER Initiatives in India**

A brief explanation of some higher education OER initiatives in India is as follows:

#### ***National Programme on Technology Enhanced Learning (NPTEL)***

The National Programme on Technology Enhanced Learning (NPTEL) is a joint venture of the IITs and IISc, funded by the Ministry of Education (MoE) Government of India, and was launched in 2003. It is a joint venture between the seven Indian Institute of Technology and the Indian Institute of Science, Bangalore. Initially, it started as a project to take quality education to all corners of the country. NPTEL now offers close to 600+ courses for certification every semester in about 22 disciplines. <https://nptel.ac.in/>.

- Largest online repository in the world of courses in engineering, basic sciences, and selected humanities and management subjects
- YouTube channel for NPTEL – most subscribed educational channel, 1.3 billion views, and 40+ lakhs subscribers
- More than 56000 hours of video content, transcribed and subtitled
- Most accessed library of peer-reviewed educational content in the world
- Translation of more than 12000 hours of English transcripts in regional Indian languages

#### ***Consortium for Educational Communication (CEC)***

Consortium for Educational Communication (CEC) is one among the University Centres set up by the University Grants Commission (UGC). CEC has been primarily set up to address the needs of higher education especially, degree level content by the use of powerful television media along with appropriate use of Information and Communication Technology (ICT). CEC produces educational programmes in different subjects by coordinating with 21 Media Centers. The e-content of CEC is in the form of audio, video, etc.

#### ***E-PG Pathshala***

For the development of postgraduate programmes in India, the Ministry of Education under the canopy of the National Mission on Education through ICT (NME ICT) has assigned UGC an assignment for the development of e-content in 77 subjects at the postgraduate level. The E Pathshala covers many subjects in its broad spectrum across the disciplines of Arts, Commerce, Humanities, Languages, Engineering and Technology, Life Science, Medical and Health Science, Physical and Basic Sciences, and Social Science. It strongly advocates “Massive Open Online Course”(MOOCS).

#### ***e-Gyankosh***

e-Gyankosh is a national digital repository meant to store, index, preserve, distribute, and share the digital learning resources developed by the Open and Distance Learning Institutions in India. The items in e Gyankosh are protected by copyright. The course material is available in PDF format that is downloadable freely. Resources can be accessed through a one-time registration. It provides access to videos. <https://egyankosh.ac.in/>

#### ***Ekalavya***

Ekalavya is another programme launched by the Indian Institute of Technology Bombay in the year 2004. It offers several programmes like e-OUTREACH, e-GURU. e-OUTREACH is a programme under which good quality audio, videos, digital text, and HTML content of educational value are created and disseminated. e-GURU is an Open Source initiative meant to provide e-guidance and online mentorship to students of B.E., M.C.A., and M.Sc. (CS/ IT/ Electronics) programmes, for their

final year projects. This venture is very helpful for the propagation of interactive education. <http://ekalavya.net/>

### Virtual Learning Environment (VLE)

It is an Institute of Life Long Learning. Virtual Learning Environment Institute of Life Long Learning is another OER initiative of the University of Delhi. VLE provides e-learning in the disciplines of Commerce and Management Studies, Humanities and Social Sciences, Sciences, Mathematical Sciences both at undergraduate level and postgraduate level.

### National Digital Library of India

The concept of the library is changing from ‘library within a wall’ to ‘library without a wall’, i.e., “Digital Library”. The digital library could transmit information to its users through the network and users will access the information anytime and anywhere at their place of work. Digital library is always adopting new technology for providing electronic information as well as presenting new forms of communication. Considering the importance of digital libraries, the Ministry of Education developed the National Digital Library India (NDLI). The objective of the NDLI India is to provide all language information content, specially also holding up regional language content information. It also gives help to all educational level disciplines from primary to postgraduate, all types of researchers along with lifelong learners of various academic courses. This article emphasizes various services offered by NDLI for access to electronic books, magazines, articles, audio, and

videos. It is an attempt to communicate the services and systems of NDL India. This article can be useful to the community of students, teachers, and users.

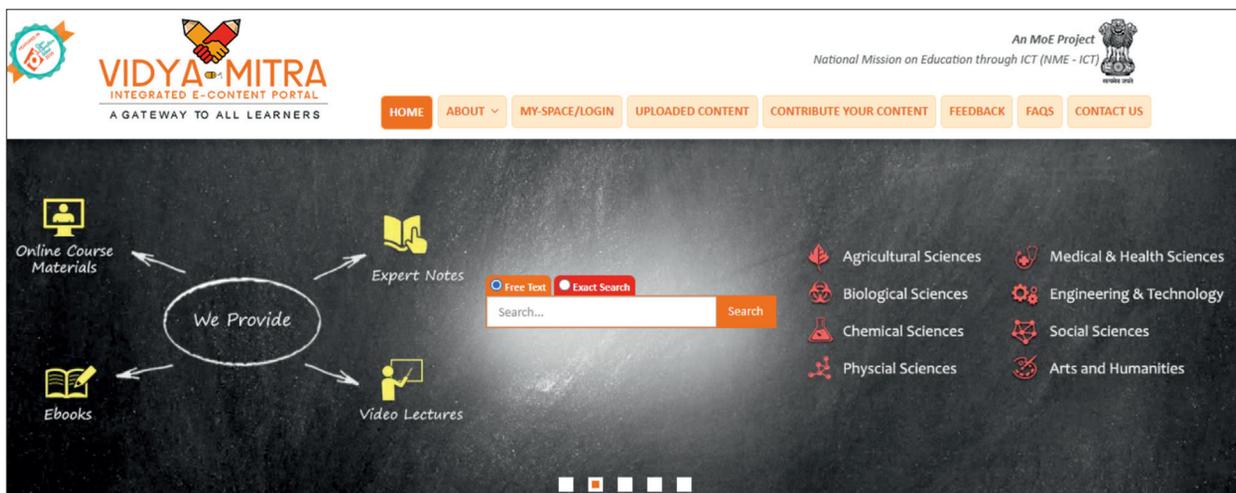
### Vidya-Mitra

Vidya-mitra is an online learning portal for all the e-content projects developed under the NME-ICT (National Mission on Education through Information and Communication Technology), MHRD. The portal provides a facility to search and browse all hosted content wherein a learner can easily access the desired material including audio/video learning material, textual material, multimedia-enriched materials, etc. through a single interface. Moreover, features of faceted search, usage statistics, project-wise access, and My-Space are incorporated into this portal. <https://vidyamitra.inflibnet.ac.in/>.

### Swayam

Swayam is a programme initiated by Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity, and quality. The objective of this effort is to take the best teaching and learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.

The courses hosted on SWAYAM are in 4 quadrants – (1) video lectures, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes, and (4) an online discussion forum for clearing the



doubts. Steps have been taken to enrich the learning experience by using audio-video and multi-media and state-of-the-art pedagogy/technology.

### ***Swayam Prabha***

The Swayam Prabha is a group of 40 DTH channels devoted to the telecasting of high-quality educational programmes on a 24/7 basis using the GSAT-15 satellite. Every day, there will be new content for at least (4) hours which would be repeated 5 more times in a day, allowing the students to choose the time of their convenience. The channels are uplinked from BISAG-N, Gandhinagar. The contents are provided by IITs, UGC, CEC, and IGNOU. The INFLIBNET Centre maintains the web portal.

### ***Shodhganga***

“Shodhganga” is the name coined to denote the digital repository of Indian Electronic Theses and Dissertations set up by the INFLIBNET Centre. The word “Shodh” originates from Sanskrit and stands for research and discovery. The “Ganga” is the holiest, largest, and longest of all rivers in the Indian subcontinent. The Ganga is the symbol of India’s age-long culture and civilisation, ever changing, ever-flowing, ever-loved, and revered by its people, and has held India’s heart captive and drawn uncounted millions to her banks since the dawn of history. Shodhganga stands for the reservoir of Indian intellectual output stored in a repository hosted and maintained by the INFLIBNET Centre. DSpace supports “Open Archives Initiative’s Protocol for Metadata Harvesting” (OAI-PMH) and uses a qualified version of the Dublin Core schema for its metadata. The INFLIBNET Centre, promotes the setting-up of institutional and ETD repositories in member universities using OAI-PMH-compliant software. A number of member universities have already set-up their institutional and ETD repositories using either DSpace or other OAI-PMH compliant Institutional Repository software. It would be possible for universities to have sufficient network and computing infrastructure to maintain their own ETD repositories wherein their research scholars could deposit e-versions of their theses and dissertations. At present 450000 Full text theses are accessible.

### **Issues and Challenges with Open Educational Resources**

- i. Using OER will still require an understanding of licensing terms, which may stand in the way

of particular types of re-use. Producing OER, especially when this involves drawing on existing copyrighted works, such as newspaper articles or pictures also requires knowing what is possible, and then how to apply for the right license and make this clear to developers and to users.

- ii. There may also be legal issues for platforms hosting OER, which in some circumstances may be made liable for the actions of uploaders. Finally, users may also need to be aware that the use of some OER may involve data collection, and so raise privacy concerns. Given the issues above, there are issues around the level of legal and copyright literacy of developers, librarians, and others. Where this is lacking, there may be mistakes or confusion as to what is possible.
- iii. A separate concern is around the perceived quality of OER. Given that it does not always follow a traditional editorial process, some suggest it meets a lower standard. However, OER can be peer-reviewed through open methods and there is a lot of high-quality material available. Nonetheless, there is a need to combat the assumption that OER is of a lower quality than conventional materials and sources. Connected to this is the potential for teachers and other educators creating OER not to receive credit for the time invested. While authoring a traditional textbook may count towards promotion or positive appraisal, this is not necessarily the case for those making and sharing OER. There are also questions about discoverability. While a lot of OERs exist, they may not easily be found by teachers or learners. Platforms and curation can play a major role in this regard, as well as offering a potential means of addressing concerns around quality, given that they make it easier to assess and identify materials.
- iv. Technological barriers can also exist. ICTs are not accessible to everyone, and many lack the skills or confidence to use them. With a large amount of OER material made available online, efforts need to be made both in digital literacy and access to digital technologies. In addition, unaddressed accessibility issues (e.g. not adapting materials to the needs of users with print disabilities) can stand in the way of access to knowledge.

### **Conclusion**

Open Educational Resources (OER’s) for higher education in India make an important

contribution to the diversified supply of learning resources to the community of learners. OER is a new trend aimed at providing free access to a variety of learning resources over the Internet free of cost and has gained enormous momentum in recent years. India has been witnessing an incremental growth of OERs, where a number of International and national institutions have established OER portals for providing nationwide access to their educational resources. Institutions with better access to ICT infrastructure will make more use of open resources rather than those lacking adequate infrastructure. So, for ensuring equitable access to open resources, equitable access to technology is a must. Even the best e-content is of no significance unless there is widespread awareness among the common masses on the availability of such resources.

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# The Impact of Online Learning on Higher Education: A Comparative Analysis of Traditional vs Virtual Classrooms

Atul K Ghadge\*

In an era marked by rapid technological advancement and global connectivity, the landscape of higher education is undergoing a profound transformation. The advent of online learning has ushered in a new era, challenging the conventional paradigms of traditional classrooms. This article embarks on a comprehensive exploration, a juxtaposition of the traditional and virtual realms of higher education, with a keen focus on the manifold impacts that online learning exerts on this venerable institution. Traditionally, the hallowed halls of academia have echoed with the resonance of professors' voices, chalk on blackboards, and the rustling of textbooks. However, the twenty-first century has seen a seismic shift towards online education, which has been amplified by the recent global events that prompted an unprecedented surge in remote learning. Students, educators, and institutions have had to adapt to this brave new world of virtual classrooms, forging ahead into uncharted territory. This comparative analysis seeks to unravel the multifaceted effects of online learning on higher education, dissecting the strengths and weaknesses of both traditional and virtual pedagogical models. By examining these paradigms side by side, we aim to provide a holistic understanding of the impact that online education has on student engagement, accessibility, pedagogical innovation, and the overarching educational experience. Throughout this article, we will traverse the intricacies of student-teacher interactions, the evolving role of technology, the democratization of knowledge, and the implications for the future of higher education. Through empirical data, expert insights, and critical analysis, we endeavor to inform educators, administrators, policymakers, and all stakeholders in higher education about the nuanced dynamics shaping the academic world today. As we embark on this journey through the intersections of tradition and innovation, we invite readers to contemplate the profound transformations underway in higher education and engage in a thoughtful dialogue about its future. The impact of online learning on higher education is a subject of paramount importance,

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and this comparative analysis aims to provide valuable insights that will shape the discourse surrounding the evolution of our cherished institutions.

## The Evolution of Online Learning

The emergence of online learning within the realm of higher education finds its roots in a rich historical tapestry of educational innovation and technological progression. This journey through time showcases the transformative trajectory that online education has embarked upon.

### *Precursors to Online Learning*

Online learning can trace its origins to correspondence courses in the 19th century, where students received course materials by mail. However, it was not until the mid-20th century that institutions began experimenting with televised lectures, representing an early incarnation of distance education. In the 1980s, the advent of personal computers laid the foundation for more interactive forms of distance learning.

### *Pioneering Institutions*

The advent of the internet in the late 20th century presented a seismic shift in education. Notably, in 1993, the National Centre for Super computing Applications (NCSA) at the University of Illinois Urbana-Champaign launched the first web browser, Mosaic. This development heralded a new era for online education. The University of Phoenix, established in 1976, is often cited as one of the first institutions to fully embrace online education, demonstrating that scalability was feasible.

### *Explosive Growth*

The 21st century witnessed exponential growth in online education. According to the National Centre for Education Statistics (NCES), during the fall of 2018, over 6.9 million students in degree-granting postsecondary institutions in the United States enrolled in at least one online course, representing 34.7% of all enrolments. This underscores the substantial reach and acceptance of online learning.

### ***Technological Advancements***

Advancements in technology, such as Learning Management Systems (LMS) like Blackboard and Canvas, have become integral to online education. Moreover, the rise of Massive Open Online Courses (MOOCs) led by institutions like Coursera and edX revolutionized access to high-quality educational content on a global scale.

### ***Global Impact***

The internationalization of online education is equally striking. UNESCO reports that in 2020, over 1.5 billion students in 190 countries were affected by the closure of educational institutions due to the COVID-19 pandemic, prompting an unprecedented shift towards online learning. This global experience has accelerated the adoption of virtual classrooms.

### ***Traditional Education Paradigm***

The traditional education paradigm, firmly rooted in historical traditions, has long been the cornerstone of higher education. This model, characterized by physical classrooms, face-to-face interactions, and printed textbooks, has played a pivotal role in shaping the academic landscape for generations. However, as we delve into this paradigm, it becomes evident that it too has experienced evolution and adaptation.

### ***Physical Classrooms and Lecture Halls***

At the heart of traditional education lie physical classrooms and lecture halls, where the instructor imparts knowledge directly to students through verbal communication, visual aids, and written materials. These spaces have historically facilitated engagement and interaction among students and educators.

### ***Structured Schedules and Fixed Timetables***

Traditional education adheres to structured schedules and fixed timetables, with courses held at predetermined times and locations. This approach ensures a synchronized learning experience for students.

### ***Printed Learning Materials***

Printed textbooks, a hallmark of the traditional model, have served as the primary source of educational content. These physical resources have provided students with a tangible foundation of knowledge.

### ***Statistics on Traditional Education***

The persistence of the traditional education paradigm is notable. According to the National Centre for Education Statistics (NCES), during the 2019-2020 academic year in the United States, approximately 19.7 million students were enrolled in degree-granting postsecondary institutions. Of these, 16.9 million students attended classes on physical campuses, underscoring the enduring presence of traditional higher education. Furthermore, according to a report by Statista, as of 2020, traditional, four-year, degree-granting institutions accounted for a significant portion of all higher education institutions in the United States. This traditional higher education landscape has been a trusted foundation for academic pursuit and the development of intellectual capabilities. However, it is imperative to acknowledge that the traditional education paradigm has not been immune to change. Technological advancements and shifts in educational philosophy have prompted an exploration of hybrid models that incorporate elements of both traditional and online learning. This evolving landscape sets the stage for a compelling comparative analysis between traditional and virtual classrooms, a cornerstone of this work.

### ***Virtual Classroom Dynamics***

The virtual classroom, an embodiment of the digital age, stands as a dynamic alternative to the traditional education paradigm. It is within this digital realm that students and educators converge, transcending geographical boundaries and embracing a spectrum of innovative pedagogical approaches. In this section, we embark on a journey through the intricacies of virtual classroom dynamics.

### ***Technological Infrastructure***

The virtual classroom hinges on a robust technological infrastructure. Learning Management Systems (LMS), video conferencing platforms, and multimedia tools form the backbone of this digital environment. These platforms facilitate content delivery, real-time interaction, and assessment in ways unimaginable within traditional settings.

### ***Synchronous and Asynchronous Learning***

One defining feature of virtual classrooms is the flexibility they offer. Students can engage in synchronous sessions, where real-time discussions and lectures occur, or opt for asynchronous learning,

allowing them to access course materials and engage with content at their own pace. This adaptability caters to diverse learning preferences.

### ***Global Accessibility***

Virtual classrooms transcend geographical limitations, enabling students from across the globe to access educational offerings from prestigious institutions. This global accessibility fosters cultural diversity, enriching the learning experience through varied perspectives.

### ***Student-Centered Approach***

The virtual classroom often promotes a student-centered approach to learning. With resources available 24/7, students have greater autonomy over their education, encouraging self-directed learning and critical thinking.

### ***Multimodal Learning***

Incorporating multimedia elements such as videos, interactive simulations, and gamification, virtual classrooms engage students through a multimodal approach. This diverse array of resources caters to different learning styles and enhances comprehension.

### ***Challenges and Solutions***

While virtual classrooms offer immense potential, they are not devoid of challenges. Issues such as digital inequity, isolation, and distractions can impede the learning process. Educators must devise strategies to mitigate these challenges, such as providing technical support and fostering a sense of community through virtual forums.

### ***Impact on Educators***

The role of educators in virtual classrooms is evolving. They become facilitators of learning, guiding students through a landscape rich in digital resources. Effective online teaching necessitates the development of digital literacy and new pedagogical approaches.

### ***Data-Driven Insights***

Virtual classrooms generate vast amounts of data. Educators can leverage analytics to gain insights into student engagement, performance, and learning patterns, allowing for timely interventions and course improvements. As we navigate the digital

contours of virtual classroom dynamics, it becomes apparent that this realm offers both opportunities and challenges. The subsequent sections of this article will delve deeper into the impact of virtual classrooms on student engagement, accessibility, pedagogical innovation, and the overarching educational experience, providing a comprehensive comparative analysis between the traditional and digital education paradigms.

### ***Future Trends***

Peering into the horizon of higher education, it is evident that the future is marked by a tapestry of evolving trends and transformative forces. These emerging trajectories promise to reshape the landscape, forever altering the way we perceive, access, and engage in higher learning. The future of higher education is poised to embrace hybrid learning models, seamlessly integrating traditional and virtual classrooms. Continuous skill development and retraining will become the norm, with lifelong learning taking centre stage. Artificial Intelligence (AI) will play a pivotal role in education, driving personalized learning experiences and providing 24/7 support to learners. The internet's global reach will foster diverse, international learning communities, and traditional assessment methods will evolve. Ethical considerations and inclusivity will be paramount, while data analytics will inform decision-making processes. Blockchain technology will revolutionize credential verification, and sustainability will become a core principle in higher education. The COVID-19 pandemic has highlighted the need for educational institutions to be resilient and adaptable, leading to increased preparedness for future crises. As we gaze ahead, these trends serve as guideposts for the transformation of higher education, fostering innovation and expanding access to knowledge in ways yet to be fully realized. In navigating this exciting terrain, higher education must remain agile and forward-thinking, ever committed to the pursuit of knowledge and the betterment of society.

### ***Conclusion***

As the curtains fall on this comparative analysis, it is evident that the impact of online learning on higher education is a multifaceted narrative, replete with both challenges and opportunities. The juxtaposition of traditional and virtual classrooms illuminates the path that higher education has traversed and the directions it is poised to explore. Online learning, once a niche

endeavour, has blossomed into a global phenomenon, particularly catalysed by the exigencies of the COVID-19 pandemic. The statistics speak volumes, with millions of student's worldwide embracing virtual classrooms as a means of accessing knowledge. This digital revolution, underpinned by advanced technologies, has democratized education, extending its reach to corners of the globe hitherto unreached. However, this transformation has not unfolded without complexities. The traditional education paradigm, steeped in history and pedagogical tradition, remains a venerable institution. The physical classroom, with its face-to-face interactions and enduring traditions, still holds sway. The comparative analysis reveals that while online learning excels in certain dimensions, it grapples with issues of engagement, isolation, and equitable access. Yet, the future of higher education lies at the confluence of these paradigms. Hybrid models, merging the strengths of both traditional and virtual classrooms, beckon. Lifelong learning is no longer a concept but a necessity, with individuals seeking education throughout their lives. Artificial Intelligence is reshaping pedagogy, offering personalized learning experiences that cater to individual needs. Ethical considerations and inclusivity are becoming touchstones, and data analytics are informing decision-making. The path forward is not one of abandonment but integration. Both traditional and virtual classrooms have a role to play in the higher education ecosystem. The challenge lies in harnessing their respective strengths to create a holistic and adaptable educational experience. The impact of online learning on higher education is a narrative still unfolding. It is a story of adaptation, resilience, and transformation. As educators, administrators, and policymakers chart this uncharted terrain, they do so with the knowledge that the future of higher education is dynamic and promising. It is a future where knowledge knows no bounds, where learning is a lifelong pursuit, and where the pursuit of excellence remains unwavering.

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# ***Viksit Bharat @ 2047: Why it Matters for Those Graduating Today***

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**Suman Bery, Vice Chairman, NITI Aayog delivered the Convocation Address at 43<sup>rd</sup> Annual Convocation Ceremony of Anna University, Chennai on September 05, 2023. He said, “India needs to look ahead to develop a shared vision, adjust to new expectations, redefine its engagement with citizens and the private sector, and be nimble in adopting cutting-edge technology.” Excerpts**

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*“Water will flow from a well in the sand in proportion to the depth to which it is dug, and knowledge will flow from a man in proportion to the extent of his learning.”*

--Verse 396 from Thirukkural

*Vanakkam!* I am delighted to be a part of the 43<sup>rd</sup> Annual Convocation of Anna University at which nearly 1.25 lakh graduates are being awarded degrees. I believe over 1,500 graduates are present here in person today. Being Asia’s oldest technical institution, Anna University possesses immense glory and heritage. The University is recognised nationally and internationally for its excellence in engineering and research, in particular. In the National Institute Ranking Framework 2023, Anna University ranked 13<sup>th</sup> in the Engineering and Research category, 14<sup>th</sup> in the University category, and secured a worldwide rank of 427 in the QS World University Rankings 2024.

In the words of Swami Vivekananda, “A nation is advanced in proportion to the education and intelligence spread among the masses.” Anna University has done great service to generations of students and to society at large.

## ***Viksit Bharat***

This coming weekend the Hon’ble Prime Minister, who is NITI Aayog’s Chairman, will receive world leaders as host of the Leader’s Summit, the pinnacle of India’s G20 Presidency year. Our G20 motto ‘One Earth, One Family, One Future’ conveys many things. India’s own civilisational values certainly, but also a vision for all countries in safeguarding the future of the planet. India’s trajectory will necessarily be pathbreaking in reconciling the custody of the planet with rising living standards. Our success will influence other countries. Be it the many dimensions of our Covid response, the effective functioning of the GST Council, or the globally recognised Aspirational Districts Programme, India has much to be proud

of. As highlighted by NITI Aayog’s recent report on improvements in the multidimensional poverty index, 135.5 million Indians escaped poverty between 2015-16 and 2019-21.

The Hon’ble Prime Minister has defined the collective goal of *Viksit Bharat* by 2047 for all of us. Not only because of the splendid achievement of Chandrayaan-3, there are many reasons for believing that this is indeed India’s take-off moment. For the next 30 years, India will be home to the largest working-age population in the world. We have made tremendous progress in areas such as resilience of institutions, provision of basic services, investment in infrastructure as well as advancements in Information Communication Technology and financial inclusion that demonstrate India’s innovation and entrepreneurial potential. The onus is now on us, but especially those graduating today, to maintain momentum over the next 25 years leading up to the 100<sup>th</sup> year of India’s independence, a period referred to as the *Amrit Kaal* by the Hon’ble Prime Minister. In his view, these 25 years could transform India as did the period between 1922-47.

Some of the key challenges for India as we strive to achieve *Viksit Bharat* include addressing regional imbalances; managing climate change and the energy transition; better managing urbanisation and adapting to disruptive technologies, among others. India’s own rise will change an already stressed global economic and security order. Whether it is climate change, national security, artificial intelligence, natural disaster response, or critical infrastructure, addressing challenges and exploiting emerging opportunities increasingly requires expertise that spans and integrates technical and social science fields.

I understand that many of you have studied engineering. An engineering perspective can bring a solutions-focused and ‘can do’ attitude and ensure changes take place through a practical, realistic, and

pragmatic mindset. You would have also acquired tangible tools like systems-based approaches and thinking, modeling, and life-cycle analysis. I am confident that your education at this prestigious university has enabled you to apply approaches that are logical, reasoned, evidence-based, data-driven, structured, methodological, and systematic.

Yet, there is more to what I might call the genius of India than just structured thinking. Multinationals who have established Global Capability Centres in India often cite a capacity for lateral thinking as an attribute of the Indian mind. And, as the Hon'ble Prime Minister repeatedly emphasizes, India's youth today are aspirational and comfortable with risk, uncertainty, and even failure. I have no hesitation in acknowledging that these are very different values from my generation. And yet they are based on deep traditional values and strong family structures evident in the success of the Indian diaspora globally. So, what goes in your mind is also an important part of India's take-off story. The country will look towards young men and women like you to help create new systems, solve problems, and effect positive change in society.

### **The Role of States**

In achieving *Viksit Bharat*, States have a crucial role to play. India grows when States grow. There are very few 'one-size-fits-all' policies that can work for the whole country. Given India's diversity and scale, differentiated strategies implemented by State Governments are crucial for accomplishing collective economic and social goals. Several States in India are larger than countries elsewhere. Citizens look to their Chief Ministers and the bureaucracy that serves them to deliver in a prudent, sustainable manner.

In this context, NITI Aayog is supporting interested States to establish State Institutions for Transformation (SITs)--multidisciplinary resources for steering development strategies. The State Support Mission has a budgetary allocation of ~INR 238 crores over 3 years (2022-23 to 2024-25). It is envisaged that over time the SITs will evolve into all-encompassing resource centres which will design strategic and long-term development strategies.

NITI Aayog has also developed a National Data Analytics Platform (NDAP) which houses datasets from a variety of Government Departments, organises them, and offers analytic and visualization capabilities. The State Support Mission seeks to collaborate with

States to develop State Data Analysis Platforms building on the backbone of the NDAP platform to facilitate evidence-based policymaking and cross-sectoral research.

### **Governing Council**

The Governing Council of NITI Aayog chaired by the Hon'ble Prime Minister comprising Chief Ministers and Lieutenant Governors of all States and Union Territories as well as selected Union Cabinet Members -- is the premier national body tasked with evolving a shared vision of national priorities and development strategies acting as 'Team India'. It meets in person once a year reinforced by periodic interaction between senior NITI Aayog officials and Chief Ministers both in Delhi and on State visits. An important recent initiative has been for intensive preparatory meetings with Chief Secretaries, in the presence of the Hon'ble Prime Minister. NITI Aayog is also used by States to provide a platform for direct interaction between State Governments and Central Ministries, helping to resolve outstanding issues.

### **India and Sustainable Development**

Much of India's development agenda is mirrored in the Sustainable Development Goals (SDGs). NITI Aayog has made consistent efforts to bring about the adoption, implementation, and monitoring of global goals at the national, sub-national, and local levels. The SDGs as a development framework have been formally accepted by all States through vision documents, monitoring dashboards, etc. NITI Aayog is at the helm of all initiatives for furthering the adoption of the SDGs, including through its G20 Presidency. NITI Aayog has not only instituted a robust national monitoring framework based on SDGs but has also taken the framework to States and UTs.

### **Aspirational Districts and Blocks**

In 2021, NITI Aayog's Aspirational Districts Programme (ADP) was lauded by the United Nations Development Programme for enabling significant improvements in the 112 least developed districts of the country across health, nutrition, and education outcomes. ADP is the world's largest initiative in results-based governance, covering an estimated population of 250 million. The ADP model is focused on promoting competition among districts, enabling convergent delivery across schemes, and fostering collaboration across and beyond Government agencies. Through an approach that promotes convergence and

coordination, these districts have steadily improved their performance in a range of socio-economic indicators. In some cases, they have even surpassed State and national averages. Virudhunagar district in Tamil Nadu, for instance, has emerged as the best performer among these 112 districts on more than one occasion since the launch of the programme.

Inspired by the success of this programme, NITI Aayog has started the Aspirational Blocks Programme (ABP) to improve socio-economic parameters in 500 blocks across India. Both ADP and ABP showcase the power of working together as Centre, States, and Districts, and the impact of data-driven governance in improving the lives of common citizens at the grassroots level.

### **Practical Implementation**

NITI Aayog has made and is continuously engaged in providing fresh policy-related inputs for implementation by relevant Central Government Ministries. It was involved with the drafting of the National Medical Commission Bill, as well as the Bills for reforming the education system pertaining to the Indian Systems of Medicine and Homeopathy. All three Bills have been passed by both houses of Parliament, paving the way for building a world-class medical education system in the country.

NITI Aayog has also been closely involved with the design and monitoring of Ayushman Bharat, perhaps the largest universal health initiative in the world. A similar key role has been played by NITI Aayog in the POSHAN Abhiyaan scheme and the reforms of the higher education system. Universal health, agriculture sector modernization, renewable energy, Mission LiFE, electric mobility, reforms of the mining sector as well as the campaign against women and child malnutrition are some examples of areas where NITI Aayog has made substantive policy inputs during its existence thus far.

### **Fostering Innovation and Entrepreneurship**

To position India as a global leader in the use of futuristic technologies, NITI Aayog is focused on establishing a robust ecosystem that nurtures innovation, and promotes democratization in the development of emerging technologies, while enabling their seamless adoption for improving the ease of living and ease of doing business.

Atal Innovation Mission (AIM) is a flagship initiative of NITI Aayog for promoting innovation and entrepreneurship across the country. AIM has adopted a holistic approach towards establishing an integrated ecosystem of innovation and entrepreneurship at school, university, and industry levels, linking NGOs, venture capital, and private industries in the process.

### **Monitoring and Evaluation**

The Development Monitoring and Evaluation Office within NITI Aayog evaluates the performance of all line Ministries based on the output and outcomes achieved in the various Central Sector and Centrally-Sponsored Schemes. Additionally, DMEO reviews the progress of infrastructure Departments of the Central Government for periodic review by the Hon'ble Prime Minister. To improve governance at all levels of Government, DMEO is collaborating with State Governments to establish similar capacities.

### **Dissemination of Best Practices**

Achieving *Viksit Bharat* by 2047 will require a significant transformation in all areas -- economic, social, and environmental. States are at the forefront of implementing innovative solutions to address developmental challenges and advance our collective goals in various sectors. It is essential that we learn from these best practices and enable their replication and scaling up. This is one of the key roles that NITI Aayog plays through sectoral compendiums of best practices, webinars, and knowledge-sharing sessions involving States and Central Ministries.

### **Conclusion**

Ultimately, the onus of putting India on a high-growth trajectory and ensuring that the benefits of growth are equitably distributed rests with both the Centre and States. India needs to look ahead to develop a shared vision, adjust to new expectations, redefine its engagement with citizens and the private sector, and be nimble in adopting cutting-edge technology. NITI Aayog will continue to work towards strengthening cooperative federalism, thereby enabling the Centre and States to work in tandem as equal partners to ensure India's success and achieve a *Viksit Bharat* by 2047.

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## CAMPUS NEWS

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### **National Webinar on Revised Assessment and Accreditation**

An eight-day National Webinar on 'Revised Assessment and Accreditation of NAAC: Changes and Challenges' was organised by the SSMRV College, Bengaluru, Karnataka in association with The National Assessment and Accreditation Council, recently. The Chief Guest of the event was Dr. Leena Govind Gahane, Deputy Advisor, NAAC. About 445 participants participated in the event.

The Welcome Address was delivered by Dr Nagaraj M S, Coordinator, IQAC and Head, Department of Commerce. He welcomed the Chief Guests, Resource Person, Organising Team, and all the participants from the academic fraternity and thanked them for their participation in the event. He also emphasised the importance of NAAC and the preparedness that each of us needs to have to take our respective HEIs to greater heights.

Dr. S Anil Kumar, Principal, SSMRV College in his opening remarks expressed his gratitude to NAAC for associating with the College for the webinar. He mentioned how NAAC is the need of the hour and how institutions need to be aware of the changes and challenges towards NAAC Accreditation.

Dr. Geetha R, Director of the College in her address emphasised the concept of quality sustenance for which NAAC strives. She mentioned the various courses like MOOCs, Corporate Open Online Courses, and SPOCs which pose new challenges to conventional education, especially in light of NEP-2020. She also mentioned how we need to gear up to face the new challenges in the new educational ecosystem.

Dr Leena Gahane set the tone for the seminar and gave an overview of the NAAC process and the whole objective of why NAAC accreditation is required in the first place. The importance of SSR was stressed. She basically stressed the fact that the vision and mission of each educational institution need to align with that of NAAC, the common factor being quality education. She appreciated the efforts of the College in embarking on such a wonderful journey.

The session by Dr Madhukar, Former Advisor, NAAC and External Member, IQAC, SSMRV

College on 'Institutional Approach towards NAAC Accreditation' emphasised how a College Management needs to prioritise the accreditation process. With the exception of NAAC which is a mandatory accreditation, the College would need to exercise discretion on what type of accreditation they would need to go for and the impact of the same in the long run, Accreditation should always be a reflective process and not an overloading process. He gave an overview of both types of metrics – Qualitative and Quantitative and discussed the same criteria. He set the tone for the next six days where a threadbare analysis of each criterion would be done. The question-answer session had questions on how to create new clubs and associations. What documents would be required for certain criteria among others? The session met with extremely positive feedback from all participants.

The session on 'Criteria 1- Curricular Aspects' was presented by Dr. Deepak Jaroliya, Professor and IQAC Coordinator, Prestige Institute of Management and Research, Indore, Madhya Pradesh. It was focused on the curricular aspects of the college and pedagogical aspects and topics such as Value-added Programmes or Certification Courses, Feedback System, Teacher's Diary, Time Table, Bridge Courses, Remedial Classes, Learning Outcomes as well as how to present the data for the same. Further, the question-answer session also had quite a few deliberations on the curricular aspects, especially from HEIs which are affiliated to any University.

The webinar on 'NAAC Criterion 2- Teaching-learning and Evaluation' was addressed by Dr. T Siddaiah, Former Registrar, Sri Venkateshwara University, Tirupathi, Andhra Pradesh through Google Meet Platform. Dr. Siddaiah elaborated on the efficiency of the techniques used to continuously evaluate the performance of teachers and students which was the major concern of this criterion. This criterion deals with the efforts of an institution to serve students of different backgrounds and abilities, through effective teaching-learning experiences. Dr. Siddaiah emphasized that the assessment by NAAC takes a holistic view of all the inputs, processes and outcomes of an institution and thus the HEIs are expected to demonstrate how they achieve the objectives of the core values through the data and information detailed

in the Self Study Reports (SSR). He stressed that the Assessment and Accreditation outcome includes a qualitative and quantitative component. The speakers' presentations were very informative. The session was followed by an interactive question-answer session with the participants. We received good responses from the delegates and the feedback from the sessions reflected satisfaction by the participants.

The next session was on 'Criteria 3- Research, Extensions and Innovations' and the Resource Person was Dr Shyam Singh Inda, Assistant Adviser, NAAC. The session focused on the Research Activities that need to be undertaken by HEIs and how to provide adequate support for conducting research. It also mentioned the various research collaborations that a HEI could undertake to get the best out of research. The Resource Person also discussed the funding aspects for research projects. Further, the question-answer session was quite elaborate and had queries about the bandwidth of research and also the time factor with regard to research projects. The session was well received by the participants.

The sessions on 'Criteria 4- Infrastructure and Learning Resources' and 'Criteria 5: Student Support and Progression' were presented by Dr. S Sreenivasa, Deputy Advisor, NAAC. It was an extremely informative session that dealt with the issues and procedures related to Infrastructure and Learning Resources. He explained the footfall analysis in the library in light of both offline and digital libraries. He also discussed student support in terms of training and placement of outgoing students, Students benefitted from Government Scholarships and free ships. The question-answer session had a great interaction with many faculty members posing their questions about criteria 4 and 5.

The next sessions were on 'Criteria 6-Governance, Leadership and Management and Criteria 7 - Institutional Values and Best Practices'. The Resource Person was Dr B S Madhukar, Former Adviser, NAAC, External Member, IQAC, SSMRV College. Each question was analyzed in detail and a probable answer was suggested for each of the same. The resource person with his vast experience was able to bring in some key aspects with regard to best practices and the next step forward. The question-answer session had questions centered around best practices and what management could do to bring in a conducive work atmosphere. The resource person also emphasised the need to go through the NAAC website and some of the important SOPs.

The session on 'Real-life Case Studies' NAAC including all the criteria was presented by Dr. D Raja Jebasingh, Vice Principal, St Joseph's College of Commerce, Bengaluru. He gave case studies as to how certain HEIs are able to score higher grades than their contemporaries. The Best Practices and the new innovations are a differentiating factor that sets these institutions apart from others. The question-answer session was also very lively where quite a few questions on real-life scenarios were discussed and deliberated.

The last day session was conducted to self-introspect the readiness of the participating HEIs towards NAAC Accreditation. Each resource person, who was an expert in the field of NAAC enlightened the virtual gathering about NAAC criteria based on their years of experience and expertise. The Vote of Thanks was proposed and E-certificates were issued to all participants in the end.

### **Seminar on Digital Citizenship at Tata Institute of Social Sciences, Mumbai**

A two-day National Postgraduate Student Seminar on 'Digital Citizenship in Contemporary India' is being organized by the School of Media and Cultural Studies, Tata Institute of Social Sciences, Mumbai from January 12-13, 2024.

Access to digital devices and the Internet is increasingly seen as crucial for practicing, enhancing, and enjoying citizenship; a phenomenon that we may loosely recognise as digital citizenship. Digital and online technologies have become an integral part of our lives, providing opportunities for education and work, collaboration and community-building, social development and progress, even as a majority of such infrastructure has come to be owned by private interests who profit from exploiting user data in a variety of ways. Nonetheless, access to digital and online technologies enables expression and connections that facilitate economic, social, and cultural rights that together constitute citizenship. Without such access, citizenship stands to be eroded of its substantive qualities in contemporary times. It is also true that while some individuals get to enjoy full citizenship, others experience a deficit because of historical and structural inequalities.

Even as we navigate this terrain marked by private interests and social and economic inequalities, it is essential to explore what the concept of digital

citizenship may mean in contemporary India and how to make it more inclusive and responsive. Amid the pandemic-induced digital acceleration, the country stands at a crucial juncture for defining its digital citizenship landscape. While the digital divide has marginally improved through a combination of state policy and private sector participation, the situation is far from ideal. Especially concerning are the issues around user data and its surreptitious use for a range of commercial and governance applications without much transparency or recourse to redressal. Equally worrying are the ways in which online spaces have been used by individual and organised groups to troll and harass journalists, human rights defenders, and gender, caste, and religious minorities.

Neither ‘digital’, nor ‘citizenship’ are stable ideas in a fixed relationship with each other as has been made abundantly clear during the COVID-19 pandemic, when social and economic relations were strained by unprecedented duress. Citizens, especially the younger ones, have used this uneven terrain of digital and online technologies to inscribe themselves in the public sphere through ingenuity and creativity, especially when restricted from accessing public spaces and institutions, such as the mainstream media. From explicitly political actions involving the use of social media for organising, gaining visibility, and amplification of their concerns, to more reflexive artistic expressions, young people have used digital and online media to not merely assert their citizenship but to also enliven and enrich it. Also, given the affordances and reach of digital and internet technologies, the notion of digital citizenship is becoming increasingly difficult to circumscribe within the context of the nation-state; its horizons exceed national or territorial boundaries, especially in the context of flows of global capital, global value chains and labour, displacement and migration, and shared concerns around ecology. The Themes of the Event are:

- Citizenship in Both National and Global Contexts with a Reference to Digital Infrastructures, Policies, and Practices.
- Digital Divide: Geography, Identity, and Terms of Access.
- Democratic Norms and Processes.
- Populism, Propaganda, and Disinformation.
- e-Governance, Including Digitisation of Public Data and Services.

- Political-economy of the Internet and Digital Media.
- The Role of the Private Sector in Digital and Online Media. Concerns Around Consolidation and Emergence or Oligopolies.
- Transparency Concerns around Data Protection and Surveillance and Their Economic and Political Impact.
- Digital Media and Public Sphere-participation, Cultural Production, and Public Opinion.
- Displacement: Refugees and Migration.
- Trolling, Stalking, Online Harassment and Sexual Violence.
- Users/Audiences: Anxieties Around Screen Use, Online Presence, AI, etc.
- Methods: Studying Digital Cultures.

For further details, contact Organising Secretary, School of Media and Cultural Studies, Tata Institute of Social Sciences, Mumbai, Maharashtra-400088, Mobile No: 08580642013 or 07304284008, E-mail: [framesofreference.smcs@gmail.com](mailto:framesofreference.smcs@gmail.com). For updates, log on to: <https://www.tiss.edu/events>.

### **National Seminar on Interplay of Women, Law and Society**

A two-day National Seminar on ‘Interplay of Women, Law and Society: Issues and Challenges’ is being organized by the School of Law, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Avadi, Chennai, Tamil Nadu from November 10-11, 2023. The faculty members, advocates, legal professionals, research scholars, students, social workers and other academic aspirants may participate in the event. The professors, faculty members, advocates, research scholars, and law students with the vision of eminent intellects in the concerned subject may participate in the seminar.

The development of any Nation is directly proportional to the development of the women in that Nation. In Many parts of the world, the legal landscape has witnessed significant transformation to better align with the principles of gender equality and women’s empowerment. Laws have been enacted to address issues faced by women such as gender-based discrimination in the family, and at the workplace where women participate fully in all aspects of life and exercise their rights without constraint. However, the relationship between women and society is far

from static. It is marked by ongoing dialogue and evolution driven by changing societal norms, advances in technology, shifts in political climates, and emerging challenges. As societies increase their awareness of the way different aspects of identity, such as gender, race, class, and sexuality, combine to shape unique experiences, there is a growing recognition of the need to revisit the framework. The Themes of the Event are:

- Historical Evolution of Women's Rights Movements.
- Legal Approaches to Combating Gender-based Violence.
- Women's Socio-economic Empowerment through Legal Reforms.
- Women's Health, Reproductive Rights, and Legal Imperatives.
- Women in the Workplace: Equal Opportunities and Challenges.
- Legal Perspectives on Cultural and Social Norms.
- Technology, Digital Space, and Ensuring Cyber-safety for Women.
- Women in Political and Decision-Making Roles.
- Land Ownership and Property Rights for Women.
- Legal Approaches to Combating Human Trafficking and Modern Slavery.
- Gender-responsive Criminal Justice Systems.
- Legal Challenges for LGBTQ+ Women.
- Legal Dimensions of Gender-based Hate Speech.
- Women's Rights in Conflict and Post-conflict Zones.
- Access to Justice: Overcoming Barriers and Ensuring Equality.

For further details, contact Dr. S. Ragupathi, Assistant Professor, Head, School of Law, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Avadi, Chennai, Tamil Nadu- 600062, Mobile No: 098844 54407, E-mail: [ragupathis@veltech.edu.in](mailto:ragupathis@veltech.edu.in). For updates, log on to: [www.veltech.edu.in](http://www.veltech.edu.in).

### **Conference on Strategies for a Digital and Inclusive Future**

A four-day India Strategy Conference on 'Strategies for a Digital and Inclusive Future' is being jointly organized by the Indian Institute of Management Ahmedabad, Gujarat, Indian Institute of

Management Bangalore, and Indian School of Business from December 14-17, 2023 at IIM Bangalore. The event may bring together senior academicians and young scholars from the global strategy community, and leading practitioners to share a common platform.

India has made massive strides in digital technology adoption across the sectors. There has been an increase in front-end digitisation by way of empowering citizens to store their documents digitally, transact using a Unified Payment Interface (UPI), and avail the majority of the citizen services using online portals. At the back end, the spectrum allocation for 4G and 5G has increased the capabilities of the citizens and organizations to rapidly communicate with each other at affordable prices.

India has also witnessed a surge in institutional development in the form of banking sector and capital market reforms, media and telecom revolution, upgradation of corporate taxation and bankruptcy norms, introduction of production linked incentive schemes and various other forms of initiatives to boost domestic manufacturing and service sectors within the country. In addition, there have been many inclusive technology and business model innovations in fintech, edtech and climate-tech sectors. India's start-up ecosystem is also growing rapidly. India's ecosystem is now the third largest in the world with large unicorns coming out of the country. In the past two decades, the ecosystem in cities such as Delhi NCR, Bengaluru and Hyderabad have seen a unique confluence of academic institutions, R&D labs, hubs, accelerators, venture capitalists, uniquely skilled and talented workforce and government regulators coming together to shape this vibrant ecosystem. The Themes of the Event are:

- Technology, Innovation and Digital Transformation.
- Environment, Society and Governance (ESG) and Non-Market Strategy.
- Business and Corporate Strategy.
- Internationalization and Global Strategy.
- Family Business and Entrepreneurship.
- Leadership and Human Capital.

For further details, contact Organising Secretary, Indian Institute of Management Ahmedabad, Vastrapur, Ahmedabad-380015, Gujarat, E-mail: [isc2023@iimb.ac.in](mailto:isc2023@iimb.ac.in). For updates, log on to: [www.iima.ac.in](http://www.iima.ac.in)

## **International Conference on Machine Learning, Image Processing, Network Security, and Data Sciences**

A two-day International Conference on ‘Machine Learning, Image Processing, Network Security, and Data Sciences’ is being organized by the Department of Computer Science and Engineering, National Institute of Technology, Hamirpur from December 21-22, 2023. The event will bring together researchers, experts, and practitioners from different fields to share their knowledge, insights, and experiences on the latest advancements and innovations in these domains. The conference aims to provide a platform for interdisciplinary collaborations and foster a vibrant community of researchers and practitioners in these areas. The event will provide an excellent opportunity for participants to learn from each other, network, and collaborate on new research projects. The Tracks of the Event are:

### ***Machine Learning and Computational Intelligence***

- Theoretical Computer Science.
- Artificial Intelligence.
- Pattern recognition.
- Computer Graphics.
- Virtual Reality.
- Distributed and Cloud Computing.
- Signal Processing.
- Software Architecture.
- Soft Computing.
- Grid and Cluster Computing.
- Evolutionary Algorithms.
- Ubiquitous Computing.
- Parallel and Distributed Networks.
- Perceptual Computing, and Related Topics.
- Learning using Ensemble and Boosting Strategies.
- Active Machine Learning.
- Manifold Learning.
- Fuzzy Learning.
- Kernel-based Learning.
- Genetic Learning.

### ***Image Processing and Computer Vision***

- Watermarking Methods and Protection.
- Wavelet Methods.
- Image Data Structures and Databases.
- Multi-resolution Imaging Techniques.
- Multimedia Systems and Applications.
- Novel Image Processing Applications.
- Camera Networks and Vision.
- Cognitive and Biologically Inspired vision.

- Active and Robot Vision.
- Fuzzy and Neural Techniques in Vision.
- Medical Image and Video Analysis.
- Color and Multispectral Processing.
- Computational Imaging.
- Video Processing and Analytics.
- Visual Quality Assessment.
- Deep Learning for Images and Video.
- Human Activity Recognition.
- Software Tools for Imaging.
- 3D Imaging.

### ***Data Sciences and Big Data***

- Big Data Management.
- Platforms and Technologies for Big Data.
- Data Retrieval.
- Big Data Storage Techniques.
- Data Mining and Warehouse.
- Data Visualization.
- Modelling Structure and Storage of Big Data.
- Scalability and Portability Issues of Big Data.
- Big Data Recommender Systems.
- Digital Forensics.
- Parallel Processing of Big Data.
- Distributed Access to Big Data.
- Applications of Big Data and Related Topics.
- Web Mining.
- Social Network Analysis.
- Text Mining.

### ***Network and Cyber Security***

- Network Performance Analysis.
- Human Factors in Security and Privacy.
- Security and Privacy in ad hoc Networks.
- Security and Privacy in e-services.
- Security and Privacy in Grid Computing.
- Security and Privacy in Mobile Systems.
- Cyber Risk and Vulnerability Assessment.
- Cyber-crime and Warfare.
- Insider Threat Detection and Prevention.
- Critical Infrastructure Protection.
- Intrusion Detection and Prevention.

For further details contact, Organising Secretary, Department of Computer Science and Engineering, National Institute of Technology of Hamirpur, Himachal Pradesh-177005. E-mail: [mind2023@nith.ac.in](mailto:mind2023@nith.ac.in). For updates, log on to: <https://mind2023.nith.ac.in>.

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# FutureSkills PRIME Programme for Re-skilling and Up-skilling

M Kumar\*

Centre for Development of Advanced Computing (C-DAC) is the premier R&D organization of the Ministry of Electronics and Information Technology (MeitY), Govt of India carrying out Research and Development (R&D) in IT, Electronics, and associated areas. C-DAC Hyderabad centre actively contributes to Cyber Security, Blockchain Technology, Strategic Electronics, e-Learning, Software Technologies, etc. The Centre is involved in R&D, product/solution development, services, and skilling activities.

Considering the need for re-skilling/up-skilling in emerging technologies towards improving the employability skills required by industry, the Ministry of Electronics, and Information Technology (MeitY) in association with NASSCOM initiated the FutureSkills PRIME programme for Re-skilling/Up-skilling of students, faculty and IT manpower for employability. Under the FutureSkills PRIME Programme of MeitY, C-DAC Hyderabad is offering three bridge courses namely Pragmatic Approach to Cyber Security, Introduction to Blockchain Technology, and Introduction to 3D Printing and CAD Modelling. Details of the Course:

- **Pragmatic Approach to Cyber Security**

The course builds core competencies focusing on Security Threats and Vulnerabilities, TCP/IP Cyber Security Perspective, Cryptography and Network Security, Network Defence, Overview of End System Security, Threat Modelling, Application Security, and Malware Analysis. Also, this course offers a virtual lab through which participants can gain hands-on training on various cyber security tools with the aim of detecting and mitigating cyber security threats. The actual course fee is Rs 1200/- but the discounted course

fee after applying the Discount/PROMO code (inclusive of taxes) is Rs 240/- only.

- **Introduction to Blockchain Technology**

*Introduction to Blockchain Technology* provides insights into Blockchain technology and its platforms. It provides an overview of the structure and mechanisms of Blockchain. The participants will be able to understand how transactions are stored in a block and mined on a Blockchain. The course acts as a bridge for advanced deep-skilling courses. This course offers a virtual lab through which participants gain hands-on training on popular tools/platforms used in developing core Blockchain. The actual course fee is Rs 1180/- but the discounted course fee after applying the Discount/PROMO code (inclusive of taxes) is Rs 118/- only.

- **Introduction to 3D Printing and CAD Modeling**

*This course* equips IT and Non-IT Professionals with strong fundamentals in Additive Manufacturing. The course explains how additive manufacturing technologies overcome the limitations of conventional manufacturing technologies and help in building product prototypes and models. The actual course fee is Rs 4000/- but the discounted course fee after applying the Discount/PROMO code (inclusive of taxes) is Rs 400/- only.

The highlights of the Programme are:

- Establish Strong Fundamentals & and Core Competencies.
- Self-paced, Online Learning.
- 90 hours Course Duration.
- Practical Oriented Course.
- Recognized by the Government.

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\*Joint Director, Centre for Development of Advanced Computing (C-DAC), Plot No. 6 & 7, Hardware Park, Srisailem Highway, Pahadi Shareef (Via), Keshavagiri (Post), Hyderabad-501510. E-mail: mkumar@cdac.in

- Validated and Approved by the Industry.
- Aligned to National Occupational Standards (NOS) Defined Under.
- the National Skill Qualification Framework (NSQF).
- Co-branded Certificate by FutureSkills PRIME and C-DAC.
- Get an edge in Career.
- Members working in Startups, MSMEs.
- Employees of Central/State Governments, PSUs, etc.
- Fresh Recruits – Internship/Apprenticeship.

The Programme is supported by the Ministry of Electronics and Information Technology (MeitY) and is intended to reach all parts of India. Students and faculty may enroll in the course to benefit from these upskilling bridge courses which are available at an affordable and discounted price. For more details, one may contact me or browse the CDAC Website: <https://cdac.in/>.

The eligibility criteria for admission are:

- Faculty, Researchers, Students (Students will be eligible for the incentive programme only if they have an internship/apprenticeship certificate).
- Professionals working in IT, ITeS, or Non-IT domains.

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**CENTRAL UNIVERSITY OF JAMMU**  
राया-सूचानी (बागला), जिला सांबा –181143, जम्मू (जम्मू एवं कश्मीर)  
**Rahya-Suchani (Bagla), District Samba – 181143, Jammu (J&K)**

**Employment Notification No. 22**  
(Dr. Ambedkar Chair Professor post)

The University invites online applications from eligible Indian nationals for the tenure post of Dr. Ambedkar Chair Professor purely on deputation / contract basis. Samarth Recruitment Portal for submission of online applications will remain open from **16.10.2023** (Monday) to **09.11.2023** (Thursday) on University website: [www.cujammu.ac.in](http://www.cujammu.ac.in).

Name of Post	No. of Post	Academic Pay Level	Specialization
Dr. Ambedkar Chair Professor ( <i>Deputation / Contract basis</i> )	01 (One)	14	Dr. Ambedkar's thought & philosophy / education. National integration & cultural nationalism

For any information, please contact Director (I/c), Centre for Comparative Religions and Civilizations on Phone No. **9313971392** and e-mail: [dir.ccr@cuajammu.ac.in](mailto:dir.ccr@cuajammu.ac.in) or visit University website [www.cujammu.ac.in](http://www.cujammu.ac.in).

No.: CUJ/Estab.T./65/2023/1809  
Date: 12/10/2023

Sd/-  
Prof. (Dr.) Yashwant Singh  
**Registrar (I/c)**  
[registrar@cuajammu.ac.in](mailto:registrar@cuajammu.ac.in)  
01923-249658

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# THESES OF THE MONTH

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## HUMANITIES

### A List of doctoral theses accepted by Indian Universities (Notifications received in AIU during the month of Aug-Sep, 2023)

#### Cultural Studies

1. Sivaram, S. **Cosmological aspects in scriptures limited to Vedas, Puranas, and Yoga Vasishtha writings in the Malayalam context.** (Dr. Rajani Jairam.), Department of Cultural Studies, Jain University, Bangalore.

#### Geography

1. Avhad, Baban Arjun. **Disparity of irrigation in agricultural development in Nashik District: A geographical analysis.** (Dr. Rajaram D Davankar), Department of Geography, Swami Ramanand Teerth Marathwada University, Nanded.

2. Bodhale, Kavita Kerba. **Hadgaon va Bhokar talukyateel loksankhya vaishishatyancha bhaugolik abhyas.** (Dr. Tolmare S S), Department of Geography, Swami Ramanand Teerth Marathwada University, Nanded.

3. Das, Dipankar. **Impact of hydrological changes and adaptation practices of the rural people in the lower Teesta River Basin of West Bengal, India.** (Prof. Ranjan Roy), Department of Geography and Applied Geography, University of North Bengal, Darjeeling.

4. Maitra, Kaustabi. **Land use changes and its impact on increasing flood frequency and magnitude in Jalpaiguri District (Undivided), West Bengal.** (Prof. Subir Sarkar), Department of Geography and Applied Geography, University of North Bengal, Darjeeling.

5. Paul, Biswajit. **A geospatial analysis of road transport network of Siliguri City, Darjeeling District, West Bengal.** (Prof. Subir Sarkar), Department of Geography and Applied Geography, University of North Bengal, Darjeeling.

6. Sailo, Lalremruata. **Bru Settlements and its implications on the political dynamics of Mizoram.** (Dr. K C Lalmalsawmzauva), Department of Geography and Resource Management, Mizoram University, Aizawl.

7. Yirang, Nalung. **Status of women in tribal society: A comparative study on ADI and Galo Tribes of East Siang District, Arunachal Pradesh.** (Prof. Kiran Kumari), Department of Geography, Rajiv Gandhi University, Itanagar.

#### History

1. Obendangla. **Slavery in the Naga Hills: A**

**historical study.** (Prof. T Gurung Nag), Department of History and Archaeology, North Eastern Hill University, Shillong.

2. Deshmukh, Ranjana Lalasaheb. **Panipatchi yudhde: Ek chikitsak abhyas.** (Dr. Tavare Vilas), Department of History, Swami Ramanand Teerth Marathwada University, Nanded.

3. Dodiya, Maheshkumar Kalabhai. **Tribal culture of Panchmahal and Dahod District: A historical study (In the context of 20th century.** (Dr. Manjulaben Tarapada), Department of History, Saurashtra University, Rajkot.

4. Hatkar, Bhimrao Jalbaji. **Aadhunaik bhartachya samvidhanik vikasateel Dr Babasaheb Ambedkar yanchi bhumika aani karya: Ek vishleshnatmak abhyas.** (Dr. U S Sawant), Department of History, Swami Ramanand Teerth Marathwada University, Nanded.

5. Hode, Gajanan Ganpat. **Bhartiya Swatantrya Ladhya madhe Nashik Jilhyateel aadivasi krantikarakanchya yogadanacha eitihasik abhyas (Kalkhand Isvi. 1818 te 1947).** (Dr. R R Mutkule), Department of History, Swami Ramanand Teerth Marathwada University, Nanded.

6. Jadhav, Tanaji Hanumant. **Maharashtrachya vikasatil Vijaysinh Mohite-Patil yanche yogdan: Ek aitihasik abhyas.** (Dr. More Babruwan Kerbaji), Department of History, Swami Ramanand Teerth Marathwada University, Nanded.

7. Kanade, Balasaheb Govindrao. **Tanjawarchya Bhosale gharanyateel Serfoji Raje Bhosle dwitiya yanchye jeevan va karye.** (Dr. S G Bande), Department of History, Swami Ramanand Teerth Marathwada University, Nanded.

8. Ram, Hardas Rajdebhai. **Historical perspective of the contribution of Dr Shambhuprasad Harprasad Deshai in various fields (A D 1908-2000).** (Dr. Praduman B Khachar), Department of History, Saurashtra University, Rajkot.

9. Sangma, Sanggra A. **History of insurgency in Meghalaya with special reference to Garo Hills.** (Dr. Tilok Thakuria), Department of History and Archaeology, North Eastern Hill University, Shillong.

10. Sawian, Adella Risa. **Literature and social**

**consciousness of the Khasi in the colonial period: A historical perspectives.** (Prof. CA Mawlong), Department of History and Archaeology, North Eastern Hill University, Shillong.

11. Suryawanshi, Rajendra Hiran. **Dr. J M Waghmare vyakti va karye: Ek aitihāsik abhyas.** (Dr. Suryawanshi N B), Department of History, Swami Ramanand Teerth Marathwada University, Nanded.

12. Vhadgir, Ramprasad Mohanrao. **British Rajvatiche Maharashtrachya vikasateel yogdan: Ek aitihāsik avlokan: Isvi 1818 te Isvi. 1947.** (Dr. Shivraj Bokade), Department of History, Swami Ramanand Teerth Marathwada University, Nanded.

## LANGUAGES & LITERATURE

### English

1. Bhujbal, Manoj Shivraj. **Narrative techniques in the select novels of Graham Swift.** (Dr. M.B. Karajgi), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

2. Dasgupta, Rushati. **Narratives of displacement: A study of select Indian Diasporic short stories.** (Dr. Ancy Eapen), Department of English, Jain University, Bangalore.

3. Deshmukh, Kiran Panjabrao. **Quixotic elements in world literature: A comparative study of select novels.** (Dr. Yogini Satarkar), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

4. Dusunge, Rameshwar Barku. **Representation of Mumbai in the select Indian English novels: A comparative study.** (Dr. Nitonde R S), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

5. Gakkula, Mahender Kumar G Mallaiiah. **English loan words in Japanese language: A socio-linguistic and pedagogical study.** (Dr. Ajay Tengse), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

6. Gouse, Mohammed Mazhar Mohammed. **A study of English language teaching at the higher secondary schools in Nanded District: Trends and challenges.** (Dr. G Venugopal), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

7. Hangarge, Vaijanath Gangaram. **Post-modern African-American and Indian fiction: A comparative study.** (Dr. D P Digole), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

8. Hiware, Jyoti Suryabhan. **Critical appraisal of Mahesh Elkunchwar: The Indian dramatist.** (Dr. Mahendra Shinde), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

9. Jataniya, Nishita Rajeshbhai. **A translation of selected critical essays of Umashankar Joshi from Gujarati into English with a critical introduction.** (Dr. Kamal Mehta), Department of English, Saurashtra University, Rajkot.

10. Kumbhar, Mahesh Jagannath. **Exploring the problems of youth in the select novels of Chetan Bhagat: A study.** (Dr. R D Kamble and Dr. Sudam Shankar), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

11. Lowang, Chatung. **Developing textual material using folk oral resources: A study of ESL education among the noctes of Tirap District.** (Dr. K C Mishra), Department of English, Rajiv Gandhi University, Itanagar.

12. Pashiya, M. **Akavum Puravum from Champu to modernities: Exploring eco-spaces and sexualities through writings in the Malayalam context.** (Dr. Sreedevi Santhosh), Department of English, Jain University, Bangalore.

13. Shetkar, Bapshetti Rajendra. **Theatre of the Absurd: A comparative study of the select plays of Eugene Ionesco and Norman F Simpson.** (Dr. R D Kamble and Dr. Prashant Mannikar), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

14. Sonia. **Consciousness of nationalism and spiritualism: A comparative study of select essays and letters of Rabindranath Tagore and Romain Rolland.** (Dr. Ravi Bhushan), Department of English, Bhagat Phool Singh Mahila Vishwavidyalaya, Khanpur Kalan.

15. Veerappa, Manjula. **Narrating the sporting self: A comparative study of selected Indian sportspersons' autobiographies.** (Dr. D Yogananda Rao), Department of English, Jain University, Bangalore.

16. Waghmare, Madhav Namdevrao. **Representation of Buddhist followers in postmodern American novel.** (Dr. Rajpalsingh S Chikhalikar), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

17. Yamuna, U V. **Real and imagined cosmopolitan places: Representing margins- 'Environment' and women in modern Malayalam novels.** (Dr. Sreedevi Santhosh), Department of English, Jain University, Bangalore.

### Hindi

1. Chande, Dipmala Manjibhai. **Harpal Singh 'Arush' kee kahaniyoan mein Bhartiye samaj ka chitran.** (Dr. N T Gamit), Department of Hindi, Saurashtra University, Rajkot.

2. Chauhan, Anirudhashih Chandrashih. **Hindi mahila atamkathakaroon ke atamkatha mein nari chetna.** (Dr. N M Dodia), Department of Hindi, Saurashtra University, Rajkot.

3. Indalkar, Subhash Shankarrao. **Kusum Kumar ke samagra sahitya ka samikshatmak adhyayan.** (Dr. Praveen Kamble), Department of Hindi, Swami Ramanand Teerth Marathwada University, Nanded.

4. Mangrulkar, Maheboob Sharfoddin. **Bhuvaneshvar Upadhyay ke sahitya mein vyakt jan jivan.** (Dr. Ranjit Jadhav), Department of Hindi, Swami Ramanand Teerth Marathwada University, Nanded.

5. Maru, Sangita Bhojabhai. **Asghar Wajahat ke upanyasoan ka samikshnatamak adhyayan.** (Dr. Kamlesh C Desai), Department of Hindi, Saurashtra University, Rajkot.

6. Neog, Puja. **Veer Bharat Talwar ke alochana drishti mein adivasi.** (Dr. Joram Yalam Nabam), Department of Hindi, Rajiv Gandhi University, Itanagar.

7. Pandey, Vandana. **Manisha Kulshreshth ke katha sahitya mein chaitanyata-bodh: Ek vishleshan-parak adhyayan.** (Dr. V K Mishra), Department of Hindi, Rajiv Gandhi University, Itanagar.

8. Patel, Alpeshkumar Babulal. **Mohan Rakesh ke natkoan mein atit aur vartman.** (Dr. Jivanbhai Dangar), Department of Hindi, Saurashtra University, Rajkot.

9. Shaikh, Imran Vajir. **Asgar Wajahat ke upanyasoan mein abhivyakt sampradayikata ke samasya: Ek adhyayan.** (Dr. Satish Yadav), Department of Hindi, Swami Ramanand Teerth Marathwada University, Nanded.

10. Tabi, Oroty. **Arunachal Pradesh ke Apatani Janjati ke lok sahitya ka vishleshnatamak adhyayan.** (Dr. Jamuna Bini Tadar), Department of Hindi, Rajiv Gandhi University, Itanagar.

11. Vasava, Subhashbhai Narpatbhai. **Pramukh Hindi upanyasoan mein nari-vimarsh: Mannu Bhandari, Usha Priyamvada tatha Ilachandra Joshi ke charchit upanyasoan ke pariprekshey mein.** (Dr. B J Patel), Department of Hindi, Saurashtra University, Rajkot.

12. Yadav, Subhash Chand. **Ramcharitmanas ke niti tatvoan ka vishleshnatamak adhyayan.** (Dr. Krishna P Patel), Department of Hindi, Saurashtra University, Rajkot.

## Marathi

1. Rathod, Santoshkumar Shankar. **Marathiteel**

**nivadak bakadambaricha: Chikitsak abhyas.** (Dr. Sharda Kadam), Department of Marathi, Swami Ramanand Teerth Marathwada University, Nanded.

2. Waghmare, Balaji Harishchandra. **Sant sahyateel dalit janivanacha vivechak abhyas.** (Dr. Lahu Digambar Waghmare), Department of Marathi, Swami Ramanand Teerth Marathwada University, Nanded.

## Mizo

1. Remlalthlamuanpuia. **Romanticism in Mizo poetry with reference to the works of P S Chawngthu, Lalsangzuali Salio and V Thangzama.** (Prof. Lalitluangliana Khiangte and Dr. Zothanchhingi Khiangte), Department of Mizo, Mizoram University, Aizawl.

## Sanskrit

1. Barmola, Ramesh Chandra. **A critique of Srikrishnavilasamahakavya by Sukumarkavi in the light of Sanskrit poetics.** (Dr. Raghavendra Bhat), Department of Sahitya, Central Sanskrit University, New Delhi.

2. Das, Swyambha. **A critical study on Jyapakasamuchchaya of Sriuroshottamadeva.** (Prof. Anupama Prushti), Department of Navya Vyakarna, Central Sanskrit University, New Delhi.

3. Gautam, Anjali. **Shri Padmanabhadikshitpraneetmatrikagranthas ya "Sarvasanskarpaddhateh" samikshatmakam sampadanam.** (Prof. Bhagwati Sudesh), Department of Dharmashastra, Central Sanskrit University, New Delhi.

4. Pandey, Anupam. **A Critical study of Pathyaratnakosha in Sangitaraja a text in musicology tradition written by Maharana Kumbha.** (Prof. Shishir Kumar Pandey), Department of Sahitya, Central Sanskrit University, New Delhi.

5. Sharan, Ganga. **A comparative study of Gitganeshakavya and Gitgovinda.** (Dr. Kripashankar Sharma), Department of Sahitya, Central Sanskrit University, New Delhi.

6. Sharma, Khem Lall. **A critical study of the principles of cases in Panini grammar and Nepali grammar.** (Prof. Dhaneendra Kumar Jha), Department of Vyakarna, Central Sanskrit University, New Delhi.

## Philosophy

1. Gajera, Trupti Mansukhbhai. **The concept of Brahma in Sankara and post-Sankara Vedanta: A critical study.** (Dr. Dyuti Yagnik), Department of Philosophy, Saurashtra University, Rajkot. □

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3.	Consultant (Admn.)	Consolidated remuneration of Rs. 50,000 for US level & Rs. 60,000/- p.m. for DS level	01

**A. Educational Qualifications, eligibility and other requirements etc., for regular appointments are as under:**

**1. Section Officer, Two Post (UR-1 & OBC-1), Pay level-8,**

**Age Limit: 35 years** (relaxable by 5 years for employees of Government Departments/Autonomous Bodies/ Institutions of Higher Education of the Central/State Government).

**Essential:**

- i. Master's degree from a recognised university with consistently good academic record;
- ii. At least 6 years of experience of handling administrative/ audit/accounts/printing & publication/ foreign higher education/ sports and cultural activities in Central/State Government Departments/Autonomous Bodies /Institutions of Higher Education/ Public Sector Undertakings/NGOs/Corporates/Consultancy Organisations at the level of PB-2 (Rs. 9300-34800) with GP of 4200 on regular basis or equivalent;
- iii. Knowledge of Government rules & regulations

**Desirable:**

Proficiency in working on computer applications

**2. Assistant, One Post (SC) Pay Level-6**

**Age Limit: 35 years** (relaxable by 5 years for employees of Government Departments/Autonomous Bodies/ Institutions of Higher Education of the Central/State Government).

**Essential:**

- i. Bachelor's degree from a recognised university with consistently good academic record;
- ii. At least 10 years of experience of handling administrative/stores / estate/audit/accounts/ printing & publication/ foreign higher education/sports and cultural activities in Central/ State Government Departments/ Autonomous Bodies/ Institutions of Higher Education/ Public Sector Undertakings /NGOs/ Corporate/ Consultancy Organizations at the level of PB-1 (Rs. 5200-20200) with GP of Rs. 2400 or equivalent or 6 years of experience in PB-1 (Rs. 5200-20200) with GP of Rs. 2800 on regular basis or equivalent.

**Desirable:**

Proficiency in working on computer applications.

(Cont'd on Page 102)

- 3. Consultant (Admn)- One Post (purely on contractual basis for a period of six months)** on a consolidated salary of Rs.50,000/Rs.60,000 p.m. for retired US/DS Level respectively; Age Limit: Not exceeding 65 years;

**Essential** The candidates retired from Govt. Sector at the level of Deputy Secretary/Under Secretary or equivalent level having relevant work experience in the field of establishment/general administration in Govt. departments/ Autonomous Bodies/ Universities.

**General instructions and guidelines:**

- 1) Employment of the Association shall be governed by the Rules and Regulations, Bye-Laws and service conditions, as may be notified by the Association from time to time;
- 2) The crucial date for determining the age limit shall be the closing date for receipt of applications;
- 3) Mere fulfillment of eligibility criteria shall not necessarily entitle an applicant to be called for test/interview. The Association reserves the right to relax any of conditions and shortlist the applicants in a manner as it may specify;
- 4) Relaxation in marks shall be permissible to SC/ST candidates as per Government of India rules/guidelines;
- 5) Candidates applying for reserved posts should be in possession of appropriate caste/category certificate issued by the competent authority. Further, candidature of applicant shall be subject to verification of certificates at any stage;
- 6) No person shall be appointed to any post unless:  
He/she produces a certificate of health and medical fitness from a registered medical practitioner; He/she produces documentary evidence to substantiate his/her qualifications and antecedents as prescribed for the post;
- 7) Appointment through direct recruitment shall initially be on a probation for a period of two years from the date of appointment, which may be extended by another one year by the competent authority for reasons to be recorded in writing; provided that in the case of a person, who prior to his/her appointment had served in a Central/State Government/ University/Other Institutions of Higher Education for more than five years in a similar capacity satisfactorily, the appointing authority may reduce the period of probation by not more than one year;
- 8) Where a person during his period of probation is found unsuitable for holding the post or does not complete the period of probation satisfactorily, the appointing authority may:10)  
In case of a person appointed by direct recruitment, terminate his/her services without notice; or extend his/her period of probation by not more than one year beyond which no extension of probation shall be permissible.
- 9) Applicants who are already employed in Government Departments/Autonomous Bodies/Institutions of Higher Education shall apply through proper channel and submit No-objection Certificate and Vigilance Clearance from their employer at the time of interview;
- 10) The seniority shall follow the order of ranking at the time of selection. Persons appointed as a result of an earlier appointment will be senior to those appointed as a result of a subsequent selection;
- 11) Persons appointed in a substantive or officiating capacity to a higher grade shall retain their relative seniority in the lower grade;
- 12) In cases where the date of joining is the same and ranking has not been specified, the inter-seniority will be determined with reference to age, the elder person being deemed senior;

- 13) Where a person selected initially on a temporary basis is confirmed subsequently in an order different from the order of merit indicated at the time of his/her selection, seniority shall follow the order of confirmation and not the original order of merit;
- 14) Cases which are not covered in the above guidelines would be determined by the Governing Council;
- 15) Selection of candidate may involve written examination or skill test or interview or both as the Association deemed fit:
  - (i) Selection of candidates for the positions in Pay Level-8 and above shall be through interview;
  - (ii) Group B posts below Pay Level-8 shall be through written test;
  - (iii) The syllabus for the written examination shall be as prescribed by the Association. All the candidates who fulfill the minimum qualifications/criteria for the post applied shall be called for the examination;
  - (iv) Applications received for such posts shall be screened for shortlisting by a Committee constituted by the Appointing Authority;
  - (v) The maximum number of candidates to be called for interview for a post shall not ordinarily exceed five for one post. The Association, if necessary, may undertake screening of applications, conduct of written examination, skill test and preparation of merit list or outsource the entire process of activities to an outside agency.
- 16) The upper age limit prescribed for direct recruitment shall be relaxable by 5 years in case of candidates belonging to Scheduled Castes, Scheduled Tribes, Other Backward Classes, PwD and Ex-Servicemen categories as per Govt. of India rules/guidelines notified from time to time;
- 17) Upper age-limit as prescribed for direct recruitments shall not be applicable in case of Internal Candidates applying for direct recruitment;
- 18) Vacancies notified for direct recruitment may be filled up on deputation basis by taking officials of appropriate grade on deputation for specified period (s) from the Central/State Governments, Autonomous Bodies and/or Higher Educational Institutions.
- 19) No TA/DA shall be payable to applicant for any journey performed for attending the test/interview.
- 20) The posts shall carry allowances as per the AIU Rules.
- 21) The Association reserves the right of not filling any advertised post(s) without assigning any reason.
- 22) The Association reserves the right to increase or decrease the number of posts to be filled-up.
- 23) Canvassing in any form or on behalf of a candidate shall lead to disqualification of the candidate.
- 24) The envelope containing application should be super-scribed as "Application for the post of.....".
- 25) Prescribed application form can be downloaded from the AIU website: <http://www.aiu.ac.in>.
- 26) Applications on prescribed form complete in all respect along with application fees through Demand Draft of Rs.500/- for Group B (Sl. No.1&2) posts for general candidates and Rs.250/- for SC/ST/OBC/PwD candidates and Rs.500/- for Consultant favoring Association of Indian Universities, payable at New Delhi should reach to the Secretary General, Association of Indian Universities, AIU House, 16, Comrade Indrajit Gupta Marg, New Delhi 110 002 within 30 days from the date of publication of advertisement in the Employment News.
- 27) Disputes, if any, shall be subject to jurisdiction of Delhi Courts only.

**Secretary General**



GOVERNMENT OF INDIA

## Ministry of Education Department of Higher Education, Technical Section – I

### Invitation of Applications for the post of Director, IIT Bombay

Applications are invited for appointment to the post of Director of Indian Institute of Technology Bombay. The Director of an IIT is the academic and administrative head of the Institution. He/she is expected to have a minimum of 5 years' administrative experience and leadership qualities to head an Institute of National importance. The candidate/ person should be a Ph.D. with first class or equivalent at the preceding degree, preferably in a branch of Engineering. In exceptional cases, candidates with Science, Mathematics or Management degrees may be considered. He/she should have an outstanding academic record throughout and a minimum of 10 years teaching experience as a Professor in a reputed Engineering or Technology Institute or University and should have guided Ph.D. students. The applicant should preferably be less than 60 years of age on the last date of receipt of the applications. The post carries a fixed pay of Rs. 2,25,000/- (Revised) per month, with allowances as per rules.

2. Interested individuals may apply giving their detailed resume in the prescribed format clearly bringing out research, teaching, industry-academia collaborations and administrative achievements, along with a two-page justification in support of their candidature, a two-page vision statement for the institution and contact details of at least two distinguished individuals well acquainted with their work. The application typed in the prescribed format along with enclosures may be sent by Registered/Speed Post to **The Under Secretary (TS.1), Department of Higher Education, Ministry of Education, Room No. 428 "C" Wing, Shastri Bhawan, New Delhi-110001** so as to reach the Ministry **on or before 30<sup>th</sup> November, 2023**. The detailed advertisement and the format of application is available on the website.

URL: [https://www.education.gov.in/sites/upload\\_files/mhrd/files/advertisement/iit\\_bombay.pdf](https://www.education.gov.in/sites/upload_files/mhrd/files/advertisement/iit_bombay.pdf)

### NIRMALAGIRI COLLEGE

(NAAC Re accredited with A++ Grade)

Affiliated to Kannur University

Nirmalagiri P.O., Kannur, Kerala, 670 701

Ph: 0490 2361247

Website: [www.nirmalagiricollege.ac.in](http://www.nirmalagiricollege.ac.in)

E mail: [nirmalagiricollege@gmail.com](mailto:nirmalagiricollege@gmail.com)

Applications are invited for the following Post:

#### Principal - 01 (Unreserved)

Qualification and other requirements are as per UGC, Kerala State and Kannur University Rules and Regulations.

Application forms can be had from the college office on payment of ₹ 2000 (₹ 2100 by post). Duly filled in applications should reach the college office **within 30 days** from the date of this notification.

**N.B:** *As there is currently no sufficient workload in the Economics discipline, applicants from outside the college belonging to the Economics discipline cannot apply for this post.*

Manager