

## **Critical Analysis of Digitalisation of Higher Education: A Cross-Sectional Study**

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### **Abstract**

Higher education in India has gone digital, changing the environment of learning and bringing with it both considerable advantages and challenges. Positively, the democratization of digitalization has made high-quality resources and courses from recognized universities accessible to students living in rural places. It has made flexible learning possible, letting students learn whenever and wherever it is most convenient for them. Additionally, it has improved access to a variety of interactive resources and educational materials, resulting in a more dynamic and customized learning environment. The transition to digital education has brought attention to the digital gap, a situation in which kids from low-income families lack access to the internet and critical technologies. Furthermore, low digital literacy among teachers and students frequently compromises the efficacy of digital education. The development of soft skills and peer learning might be impacted by the lack of in-person engagement. Therefore, even while digitalization has the potential to significantly change higher education in India, resolving these issues is essential to guaranteeing that all students receive an equal education. Study survey was conducted among 269 students to know the factors that show Digitalization of Higher Education and found that Online Learning Platforms, Digital Classrooms and Tools, Educational Resources and Adaptive Learning Technologies are the factors that shows Digitalization of Higher Education.

**Keywords:** Digitalization, Higher education, Rural accessibility, Flexible learning, Interactive resources, Digital gap, Digital literacy.

### **Introduction**

The digitalization of higher education in India has brought about a transformation of the educational landscape, encompassing both difficulties and benefits. Klochkova et al. (2020) assert that "digitalization" made resources from esteemed universities accessible to students in far-flung places, hence democratizing access to education. With the advent of "flexible learning," which gave students the freedom to study whenever and wherever it was most convenient for them, student involvement rose and the educational process became more customized. On the other hand, India's "digital divide" became apparent as a result of the shift to digital schooling. Lack of access to essential technologies and stable internet connectivity prevented students from economically disadvantaged families from taking full advantage of these improvements.

The COVID-19 epidemic has brought attention to the significance and difficulties associated with digitalization in higher education. Tari and Amonkar (2021) observed that the epidemic compelled academic institutions to quickly transition to virtual platforms, exposing both advantages and disadvantages of the current setup. "Online education" kept students engaged in their studies even in lockdown situations, but it also exposed how unprepared educators and institutions were for such an abrupt change. Due to low "digital literacy" and inadequate training in the efficient use of digital resources, many educators and students encountered challenges. Due to this lack of preparation, there was a noticeable learning gap, especially for those students who found it difficult to immediately adjust to the new teaching style.

Teachers were also significantly impacted by the digitalization of education. Gandhi (2021) assessed the impact of the move to digital platforms on Indian teachers. The necessity to modify their lesson plans and instructional resources for online delivery resulted in increased stress and burden for many instructors. It was difficult to keep students engaged and conduct an accurate knowledge assessment when there was no "face-to-face interaction". In order to effectively use digital tools and platforms, teachers also needed to devote time to learning new skills. Notwithstanding these obstacles, chances for professional growth and creative teaching methods were also presented by the digitalization of education. Successful adapters discovered fresh approaches to improve their instruction and foster relationships with their pupils.

### **Literature Review**

A major shift in the flexibility and transparency of academic offerings globally has been brought about by digitalization in higher education. Digitalization's impact on educational structures was emphasized by Orr et al. (2019). According to what they said, using digital technologies allowed for "better accessibility" to educational materials and "improved communication" between teachers and students. This change facilitated the creation of a more inclusive learning environment in addition to expanding the reach of academic institutions. Nevertheless, they also pointed out certain drawbacks, like the "digital divide," which was the difficulty that students from less affluent families had in obtaining the required technology. Due to this discrepancy, educational institutions must have supportive policies in place to provide fair access to digital learning environments.

With regard to online learning and the virtual environment, Patra and Sahu (2020) assessed on the larger effects of digitalization. The way in which "anytime, anywhere" access to educational content was made possible by digitalization, they highlighted, turned established learning paradigms on their head. A more flexible learning schedule that catered to the needs and responsibilities of students was made possible by this transformation. The absence of in-person encounters is one of the obstacles they noted, though, as it may prevent the development of critical social and communication abilities. The availability of internet resources could potentially cause students to experience "information overload," which they also discussed. This underscores the need for efficient material selection and management solutions in order to maximize the learning process.

In the framework of sustainable development, Toader et al. (2021) especially looked at how digitalization affected higher education during the COVID-19 epidemic. They provided evidence that, in the face of previously unheard-of interruptions, educational continuity was crucially preserved by digitalization. Academic institutions were given a "lifeline" when they switched to online learning systems, which allowed them to carry on with instruction even in the face of physical closings. However, they also highlighted a number of difficulties, such as the sudden shift to online modalities and the "digital fatigue" that teachers and students alike face as a result of extended screen usage. The necessity of a sustainable digitalization strategy was also emphasized, and they promoted the thoughtful integration of technology to help long-term learning objectives.

To guarantee the continuation of education, Samuel and Devi (2021) assessed how institutions quickly embraced digital instruments. The point they made was that this change represented a significant departure from the way education was delivered, rather than just a band-aid solution. Higher education became more accessible for students who might have otherwise encountered obstacles to education when universities integrated "virtual classrooms" and "learning management systems" to support remote study. That abrupt change also made clear that students and institutions have very different levels of access to digital infrastructure. Some colleges made the shift to online learning smoothly, while others had

difficulty because they lacked the necessary technology resources and assistance. Vishwakarma and Singh (2023) examined how digitalization was changing the quality of education and how it affected the "quality of life" for both teachers and students in the framework of the National Education Policy (NEP) 2020. Incorporating digital resources into instructional strategies, curriculum design, and assessment procedures was stressed in the policy. A more inclusive and adaptable educational system that could adjust to a range of learning settings and requirements was the goal of this alignment. They discovered that NEP-2020's digitalization promoted a "blended learning" strategy that raised student engagement and improved learning results by fusing online and traditional classroom instruction. However, they also brought attention to issues that educators and students who were not used to heavy technology use were facing, such as the "technostress" and the "digital divide."

Individualized learning enables students to study at their own pace and in accordance with their unique needs. Mathur and Gupta (2016) looked at a variety of "e-learning platforms" and digital tools that enabled individualized learning. They showed that the process of digitization facilitated more efficient "data-driven decision making" within academic establishments, enabling administrators to monitor student advancement and modify instructional approaches correspondingly. With digitalization as a backdrop, Gupta (2021) looked at the "focus on quality" in Indian higher education. They emphasized the ways in which technological advancements and digital tools have improved institutional accountability and educational standards. Colleges sought to enhance their teaching strategies and student performance by using "quality assurance frameworks" and "learning analytics." It is recommended that governments and educational leaders give priority to investments in digital infrastructure and capacity building in order to guarantee that digitalization in higher education fosters accessibility and quality for every student.

Shandilya and Srivastava (2021) looked into the "issues and challenges" related to higher education's digitalization. Among the major issues they observed was "technological readiness," which refers to the degree to which different institutions are equipped to accept and successfully incorporate digital technology. They emphasized worries about how long digital projects will last after their initial stages of implementation and the scalability of digital solutions. Also, they talked about how digitalization has affected pedagogical practices, pointing out a move toward "online learning environments" that has forced educators to reconsider time-honored teaching strategies. Goel (2021) focused on the "impact of digitalization" on faculty members' employability in India's education system. They disclosed that the process of digitization had brought about a substantial transformation in the roles and responsibilities of faculty members, necessitating that they fit in with new instructional approaches and technological platforms. Talking on how technology had completely changed the way that teachers taught, Goel talked about how "virtual classrooms" and "online assessment systems" had made it possible for teachers to reach a wider audience and increase student involvement through interactive lessons.

"Digitalization of the Indian education process" was analyzed critically by Jha and Shenoy (2016), who questioned whether this was an actual "hope" for change or just hype. They outlined the ways in which efforts to digitalize Indian higher education focused on adopting "e-learning platforms" and "online educational resources" in order to improve accessibility and efficiency. Significant obstacles were also noted, including disparities in students' and institutions' access to digital technology and infrastructure constraints. All of India's demographic groups should have equal access to digital resources, they contended, and while digitalization promised to improve learning outcomes and reach a wider audience, its actual efficacy hinged on closing these infrastructure disparities. Jain and Singh (2021) examined the "ramifications of digitalization" for Indian instructors working in higher education. They looked into how teaching methods and institutional dynamics were affected by digitization initiatives, as described in different educational frameworks and policies. Faculty preparation and pedagogical adoption issues were brought about by digitalization, even as it enabled improvements in curriculum delivery and evaluation techniques. There was demand on educators to include digital tools like "online learning management systems" and "virtual classrooms," which frequently required professional development and upskilling.

The "implementation of digital strategy" in Indian higher education institutions, Chaudhary and Sharma (2021) focused on the plans and actions made to use digital technologies for transformative impact in education. They identified how educational institutions effectively used "cloud-based educational platforms" and "digital learning environments" to improve academic delivery and administrative efficiency. They emphasized that strong leadership, as well as strategic planning and investments in technology infrastructure, were necessary for the successful implementation of digital goals.

**Objective**

1. To find the factors that shows Digitalization of Higher Education.

**Methodology**

Study survey was conducted among 269 students to know the factors that show Digitalization of Higher Education. "Random sampling method" and "Factor Analysis" were used to collect and analyze the data.

**Findings**

The survey population includes 60.6% are male and 39.4% are female. Among them 30.1% are below 20 years of age, 41.6% are between 20-25 years of age and rest 28.3% are above 25 years of age. 34.9% are in undergraduate programs, 38.3% are in bachelor's degrees and rest 26.8% are in postgraduate programs.

**Table 1 General Details**

Variables	Respondents	Percentage
<b>Gender</b>		
Male	163	60.6
Female	106	39.4
<b>Total</b>	<b>269</b>	<b>100</b>
<b>Age (years)</b>		
Below 20	81	30.1
20-25	112	41.6
Above 25	76	28.3
<b>Total</b>	<b>269</b>	<b>100</b>
<b>Level</b>		
Undergraduate programs	94	34.9
Bachelor's degrees	103	38.3
Postgraduate programs	72	26.8
<b>Total</b>	<b>269</b>	<b>100</b>

**Table 2 "KMO and Bartlett's Test"**

"Kaiser-Meyer-Olkin Measure of Sampling Adequacy"		.897
"Bartlett's Test of Sphericity"	Approx. Chi-Square	4438.092
	df	171
	Sig.	.000

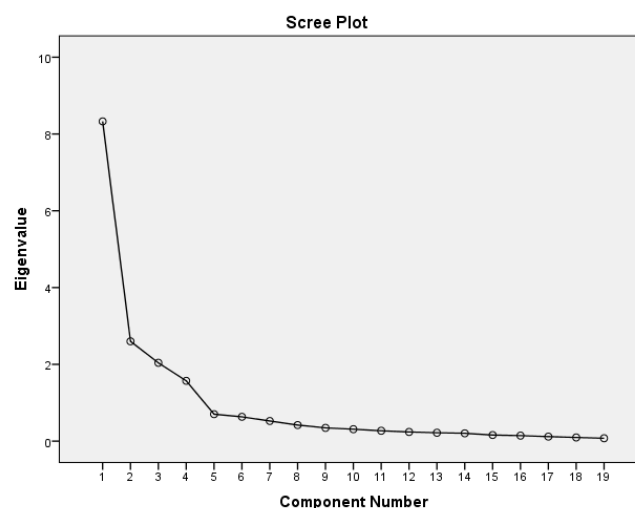
In the table above KMO value is 0.897 and the "Barlett's Test of Sphericity" is significant.

**"Table 3 Total Variance Explained"**

"Component"	"Initial Eigen values"			"Rotation Sums of Squared Loadings"		
	"Total"	"% of Variance"	"Cumulative %"	"Total"	"% of Variance"	"Cumulative %"
1	8.328	43.832	43.832	4.217	<b>22.197</b>	22.197
2	2.599	13.681	57.513	3.991	<b>21.006</b>	43.203
3	2.040	10.739	68.253	3.443	<b>18.119</b>	61.322
4	1.572	8.272	76.524	2.889	<b>15.203</b>	<b>76.524</b>
5	.702	3.697	80.221			
6	.633	3.332	83.553			
7	.525	2.762	86.315			
8	.419	2.207	88.521			

9	.345	1.817	90.338			
10	.312	1.640	91.978			
11	.270	1.423	93.400			
12	.239	1.259	94.659			
13	.219	1.152	95.811			
14	.204	1.076	96.888			
15	.160	.842	97.729			
16	.144	.757	98.486			
17	.117	.617	99.103			
18	.095	.502	99.605			
19	.075	.395	100.000			

The “principal component analysis” method was applied to extract the factors and it was found that 19 variables form 4 Factors. The factors explained the variance of 22.197%, 21.006%, 18.119% and 15.203% respectively. The total variance explained is 76.524%.



The graph above depicts the Eigen values generated from the "Total Variance Explained table" for an elbow with 4 components.

**“Table 4 Rotated Component Matrix”**

“S. No.”	“Statements”	“Factor Loading”	“Factor Reliability”
	<b>Online Learning Platforms</b>		<b>.955</b>
1	A centralized space for course materials and assignments for students and instructors	.858	
2	Common communication platform students and teachers	.851	
3	Platforms enable instructors to upload and organize course materials	.840	
4	Platforms offers forums and discussion boards	.839	
5	Online platforms break down geographical barriers	.783	
	<b>Digital Classrooms and Tools</b>		<b>.924</b>
6	Enable live, interactive classes and meetings	.896	
7	Facilitate collaboration on projects and assignments	.873	
8	Enable real-time interaction between instructors and students	.854	
9	Allow for real-time polls and quizzes	.854	

10	Enable students to review each other's work, fostering collaborative learning and critical thinking.	.725	
	<b>Educational Resources</b>		<b>.884</b>
11	Provide students with easy access to textbooks, research papers, and other educational materials	.864	
12	Free and openly licensed educational materials are available	.845	
13	Provide diverse formats of learning materials	.832	
14	Provide a centralized access point for students and educators	.714	
15	Easy sharing and dissemination of resources among educators	.669	
	<b>Adaptive Learning Technologies</b>		<b>.858</b>
16	Provide personalized learning experiences	.847	
17	Adjust content and assessments based on individual student needs	.837	
18	Provide tutoring, and support administrative tasks	.794	
19	Provide immediate feedback and modifying the learning path	.726	

**"Table 5 Reliability Statistics"**

"Cronbach's Alpha"	"N of Items"
.922	19

The reliability for 4 constructs with total of nineteen elements is 0.922.

### Conclusion

Enhancing accessibility, flexibility, and efficiency in learning, the digitization of higher education has brought about revolutionary developments. Regardless of geographic limitations, this change has given students all over the world unparalleled access to educational opportunities and resources. To further accommodate the various demands and learning styles of students, digital platforms have made it easier to create individualized learning experiences. Still, problems remain in spite of these advances. Serious concerns still surround problems like the "digital divide," in which differences in access to internet and technology impede fair learning results. In addition, in order for educational institutions and instructors to fully utilize the potential of this rapidly evolving technology, they must constantly adapt and upskill. Conclusively, although digitalization offers tremendous prospects for postsecondary education, its execution necessitates careful evaluation of accessibility, fairness, and instructional efficacy. In order to guarantee that digitalization promotes learning outcomes, broadens the scope of education, and equips students for future professional pursuits in a digitally advanced world, it is imperative that stakeholders work together to tackle these obstacles.

The study was conducted to know the factors that show Digitalization of Higher Education and found that Online Learning Platforms, Digital Classrooms and Tools, Educational Resources and Adaptive Learning Technologies are the factors that shows Digitalization of Higher Education.

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