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Digital Learning in South Indian Higher Education Institutions: Prospects and Challenges from Academicians' Perspective

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Abstract

Objectives: The purpose of this study is to investigate the perspectives of academicians regarding the current status of digital learning adopted at various higher education institutions in South India. It also seeks to identify the challenges they encounter while transitioning from traditional offline methods to online or blended modes of education. **Methods:** A survey was administered to faculty members, and statistical techniques including percentage and factor analysis were employed to analyse the data. The dataset comprised 344 responses collected by February 20th, 2023, and the survey covered two colleges from each of the five South Indian states, representing government, aided, and self-financing institutions. **Findings:** A significant finding from the study is that 44.2% of respondents agree and 36% strongly agree that one of the main challenges in digital classrooms is to capture students' attention. As a result, 49.4% of respondents believe that a blended learning approach is more suitable than complete digitization. Only 0.9% of respondents reported that they never experienced any difficulties while adopting technology in a classroom, 36.3% of academics strongly agree and 48.3% agreed to the fact that more FDPs and refresher courses pertaining to technical skill advancement are the need of the hour to tackle this educational transformation. Based on the challenges observed, the current study also proposes a 4-factor adaptability model to the higher education institutions to adopt for providing a better learning experience. **Novelty:** The study emphasizes the significance to identify the needs of academicians for adapting to the current educational transformation. There is a lack of literature on teachers' perceptions of higher education's adaptability to online education beyond the pandemic. The study recommends effective policy, ongoing technical skill enhancement training, and a blended learning approach as solutions to address the challenges associated with online education. Additionally, the study emphasizes the importance of incorporating blended learning or online courses into the

curriculum, as highlighted by the latest national education policy.

Keywords: Digital learning; academician's challenges; COVID 19; blended learning; ICT adoption in higher education; South India; NEP 2020

1 Introduction

There are two major reasons associated with the sudden boom of online education in India. Primarily, the COVID-19 pandemic has accelerated the growth of online education and highlighted the need for increased investment in digital infrastructure and resources to support online learning[1]. Rapid growth of e-learning platforms, adoption of online education by traditional educational institutions and the flexibility of time are some of the major transformations observed during the pandemic. Secondly, the new National Education Policy recognizes the importance of technology in education and proposes the use of online resources and digital tools to enhance the learning experience[2]. It aims to leverage technology to provide high-quality education to students across the country, including those in remote areas. Hence, most of the higher educational institutions are on a transformational phase of adopting innovative technology. While the sector undergoes transformation, the individuals require a wide range of capabilities, aptitudes, and skills to acclimatize to the technological era[3]. The widespread use of digital technologies creates a necessity of new competencies for the sector and several researchers criticize the sector by saying that the current curriculum does not address.

Overall, while there are challenges to be overcome, online education is expected to continue growing in India and play an increasingly important role in providing access to education for millions of students across the country. The novelty of online education lies in its ability to provide learners with unprecedented access to educational content, and to facilitate a high degree of interactivity, personalization, and innovation in teaching and learning. Especially the culturally and linguistically different groups' adaptation this change is noteworthy[4]. Recently, a convergence of traditional and digital technology is observed as of today in the current Indian education sector[5]. Blended learning combines traditional classroom instruction with online learning, allowing students to learn at their own pace and convenience. It also enables educators to provide personalized learning experiences and track student progress more effectively. The popularity of blended learning in India is expected to continue to grow, driven by advancements in technology and a growing demand for flexible, personalized learning experiences. At this juncture the academicians' perception on online education is inevitable. Teachers' perceptions are crucial in the adoption of online education because they are the ones who will be responsible for implementing and delivering online education. If teachers have a negative perception of online education, they may be resistant to adopting it and may not put in the necessary effort to develop their skills and deliver high-quality instruction. If teachers view online education positively, they are more likely to communicate the benefits of online education to their students and parents, which could lead to increased participation and support for online education programs.

Through this paper the researchers try to analyse the prospects and challenges of adopting digital learning in higher education institutions in South India from the academicians' perspective. There are several studies which are conducted internationally[6] to identify the students' perception of adoption of e-learning and even in India there are few studies[7] conducted by adopting the international tools like TAM. Whereas the current study uses a self-devised tool to collect the data from the current context. The present study aims to propose an apt contextual model for higher education institutions to garner better prospects in India. In order to propose a new model of development the researchers need to understand the current status and the challenges encountered

by the academicians in this region.

Hence, the current study investigates the following research questions:

- What is the perception of academicians at higher education institutions towards adoption of digitization into the education sector?
- What are the significant factors affecting them in their pursuit of adopting online teaching - learning?

2 Methodology

This study belongs to the descriptive research type, where it attempts to describe the reality of the use of technology and its challenges in higher education. The descriptive approach is the survey and analysis. A questionnaire consisting of both open ended and closed ended questions were distributed among several academicians from various higher education institutions. This study used both online based and paper-based questionnaires for collecting information from the academicians from various arts and science colleges in south India. The population for this study consisted of full-time faculty members who taught at both undergraduate and postgraduate level. 344 responses received till 20th February 2023 were analysed to get the results. A multistage cluster sampling is adopted to collect the data. Two colleges each from all the five south Indian states are selected for the survey.

Researchers ensured inclusivity through the selection of both urban and rural colleges equally. The respondents comprised 41.6% from rural areas and 58.4 % from urban education sectors. An equal representation from government, aided and self-financing colleges are incorporated for a comprehensive result. 14.8 % of the faculty members who were part of the survey were below the age group of 30 and even a 1.2 % representation were above 60 years of age. Few institutions appoint senior industry professionals and professors as professor of practice and adjunct faculty members after the retirement and their views on digital adoption is inevitable. The rest of the faculty members constituted the age group of 30 – 59. Text analysis was utilized to analyse the open-ended question and factor analysis and percentage analysis are the other statistical methods adopted to interpret the closed ended data [8].

3 Results and Discussion

The prospects of online education can be measured from the positive responses of the academics. Across the globe online education provides teachers with numerous benefits, including increased flexibility, reach, and professional development opportunities, as well as improved teaching and learning experiences. The adoption of technology was found to make communication with students more convenient by 76.9% of the academicians. 56.7% of the respondents agree, while 25.9% strongly agree that the use of technology, such as LMS and Google Classroom, facilitates easier completion of tasks. These platforms make it faster and simpler to collect assignments and complete additional exercises. 79.9% of the faculty members who took part in the survey concur that using digital media improves their ability to educate and enables them to convey topics clearly.

3.1 Factor Analysis

Table 2 shows the initial eigenvalues and the extraction sums of squared loadings for a principal component analysis of a set of variables. The initial eigenvalues represent the amount of variance in the data that is accounted for by each component before rotation. The extraction sums of squared loadings represent the proportion of variance in the data that is explained by each component after rotation. In this case, 13 components were extracted in Table 1. The table shows that the first component has an initial eigenvalue of 2.205, which accounts for 15.751% of the variance in the data. The second component has an initial eigenvalue of 1.314, which accounts for 9.385% of the variance. The third, fourth, and fifth components each account for over 7% of the variance. The remaining components account for less than 7% of the variance each.

The extraction sums of squared loadings show that the first component explains 15.751% of the variance, the second component explains an additional 9.385% of the variance, and so on, for a cumulative percentage of variance explained for each component. The first five components explain almost 50% of the variance in the data. It's important to note that the decision about how many components to retain in a factor analysis depends on several factors, such as the scree plot, the interpretability of the factors, and the research question. In this case, it appears that the first five components may be the most relevant for explaining the variability in the data. A scree plot is a graphical representation of the eigenvalues of the components extracted in a factor analysis. The plot (Figure 1) shows the eigenvalues on the y-axis and the component number on the x-axis, sorted from highest to lowest eigenvalue.

Table 1. Communalities

	Initial	Extraction
It is more convenient to provide information via Whats App than offline mode	1.000	.673
Using digital media enables me to accomplish tasks easier	1.000	.676
Using digital media increases my productivity in a classroom	1.000	.440
If I use digital media I can elevate my teaching ability	1.000	.372
My teaching through digital media would be more clear and understandable	1.000	.485
I encountered difficulty while implementing ICT in classroom	1.000	.373
Better policy making is essential for online education	1.000	.469
It is very difficult to gain the attention of students in a an online class	1.000	.357
Students prefer blended mode	1.000	.508
More technical skills are essential for a teacher today	1.000	.227
Lack of proper resource is a major challenge	1.000	.410
More FDP and refresher requires	1.000	.505
More professional platforms for examination is essential	1.000	.746

Extraction Method: Principal Component Analysis

Table 2. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.205	15.751	15.751	2.205	15.751	15.751
2	1.314	9.385	25.135	1.314	9.385	25.135
3	1.186	8.473	33.609	1.186	8.473	33.609
4	1.128	8.059	41.668	1.128	8.059	41.668
5	1.023	7.304	48.972	1.023	7.304	48.972
6	.990	7.068	56.040			
7	.936	6.686	62.726			
8	.900	6.431	69.157			
9	.856	6.112	75.269			
10	.788	5.629	80.898			
11	.767	5.478	86.376			
12	.702	5.015	91.391			
13	.634	4.525	95.916			
14	.572	4.084	100.000			

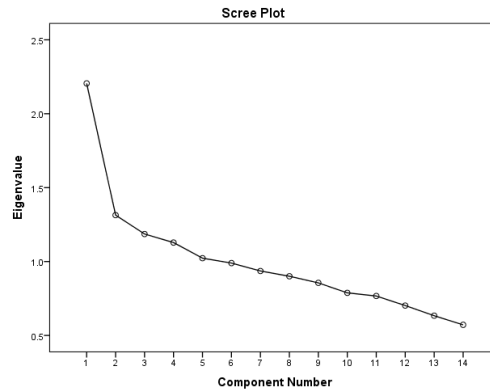Extraction Method: Principal Component Analysis

Fig 1. The plot shows the eigenvalues on the y-axis and the component number on the x-axis, sorted from highest to lowest eigenvalue

The scree plot helps to govern the number of components that should be taken in the analysis. In general, the eigenvalues of the components should decrease rapidly in the beginning and then level off to a horizontal line, forming a "scree" shape. The number of components to retain is typically determined by identifying the "elbow" of the scree plot, which is the point where the eigenvalues start to level off.

In interpreting a scree plot, it's important to balance the amount of variance explained by the components against the complexity of the model. A scree plot with a clear elbow suggests that a small number of components can explain a large proportion of the variance in the data. On the other hand, a scree plot without a clear elbow suggests that the model may be too complex and may not provide a parsimonious explanation of the data. The Component Matrix shows (Table 3) the correlations between the original variables and the principal components extracted from the data. The values in the matrix represent the loadings of each variable on each component. In this case, 5 components were extracted using Principal Component Analysis.

Table 3. Component Matrix[a]

	Component				
	1	**2**	**3**	**4**	**5**
It is more convenient to provide information via WhatsApp than offline mode	.182	-.733	.177	.105	-.245
Using digital media enables me to accomplish tasks easier form	.269	.591	-.206	-.446	-.118
Using digital media increases my productivity in a classroom	.401	-.306	-.068	-.408	.122
If I use digital media I can elevate my teaching ability	.514	-.144	-.195	.181	-.130
My teaching through digital media would be clear and understand a	.145	.497	.403	.220	-.083
I encountered difficulty while implementing ICT in classroom	.405	.000	.078	-.253	.372
It is more convenient to provide information via WhatsApp than	.452	.033	-.556	.312	.061
Better policy making is essential for online education	.393	.189	.396	.328	-.123
It is very difficult to gain the attention of students in an online class	.361	-.011	.284	-.313	.217
Students prefer blended mode	.513	.062	-.474	.065	-.108
More technical skills are essential for a teacher today	.391	-.099	.241	-.008	.080
Lack of proper resource is a major challenge	.496	-.073	.207	-.312	-.136
More FDP and refresher requires	.492	.097	.154	.162	-.451
More professional plat forms for examination is essential	.310	.032	.079	.420	.683

Extraction Method: Principal Component Analysis.
a. 5 components extracted.

The first component has high loadings for the variables "If I use digital media, I can elevate my teaching ability", "Using digital media increases my productivity in a classroom", "Using digital media enables me to accomplish tasks easier from", "It is more convenient to provide information via WhatsApp than offline mode", and "I encountered difficulty while implementing ICT in classroom". This component seems to reflect the overall positive impact of digital media on teaching and learning.

The second component has high loadings for the variables "It is more convenient to provide information via WhatsApp than offline mode" and "Students prefer blended mode". This component seems to reflect the preference for more flexible and blended learning modes.

The third component has high loadings for the variables "My teaching through digital media would be clear and understandable" and "Better policy making is essential for online education". This component seems to reflect the importance of clear communication and effective policy-making for online education. The fourth component has high loadings for the variables "Lack of proper resources is a major challenge" and "More professional platforms for examination is essential". This

component seems to reflect the need for better resources and infrastructure for effective online education. The fifth component has high loadings for the variable "More FDP and refresher required". This component seems to reflect the need for continuous professional development and training for effective teaching through digital media.

The Table 4 shows the reliability statistics for the set of 1 item in the survey, as measured by Cronbach's alpha coefficient. Cronbach's alpha is a measure of internal consistency, which indicates the degree to which the items in a scale or test are related to each other and measure the same underlying construct. In this case, the Cronbach's alpha coefficient is .568, which is generally considered to be moderate. This suggests that there is some degree of internal consistency among the items, but the scale is not highly reliable. The table also includes the Cronbach's alpha coefficient based on standardized items, which is .562. This suggests that standardizing the items did not have a significant effect on the internal consistency of the scale. Overall, while the reliability coefficient is moderate, it is still above the generally accepted minimum threshold of .6, indicating that the scale has some degree of internal consistency. However, it may be advisable to revise or remove some of the items to improve the reliability of the scale.

Table 4. Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.568	.562	14

3.2 Academicians Challenges

Only 9% of respondents reported never experiencing any difficulties, while 47.4% agreed and 33.1% strongly agreed that they often encounter difficulties when integrating ICT in a classroom setting. Despite this, 16.6% remained neutral on the matter. 47.4 % agree with the fact that they find it difficult to cope with the frequent transition of technology and its adoption in the teaching learning process. 44.2 % agree and 36 % strongly agree to the fact that achieving students' attention in digital classrooms as one of the major challenges. Hence 49.4 % of them felt blended mode is apt than complete digitization. Infrastructure is a constant challenge to any development and even in the case of adoption of the digital teaching learning process and current study identified that 52.9 % of the respondents agree, and 32.8 % of respondents strongly agree to the fact that lack of adequate resources is another major challenge. 36.9 % strongly agree and 44.5 % agree that more professional platforms are essential for examination.

According to the study, 72.1% of the population received an income that falls within the range of Rs. 30000-80000, which could be considered a moderate-income range. Another 13.1% of the population received an income above Rs. 80000, which could be considered a higher income range. However, 14.8% of the population still worked with an income less than Rs. 30000, which could be considered a lower income range. The study also found a large disparity between income levels and technological adoption. It denotes that people with higher incomes tend to adopt new technologies more quickly than those with lower incomes and affirms that there is a divide in access to technology based on income, with higher-income individuals having greater access to technology than those with lower incomes.

When asked about the challenges faced by students in adapting to online education, the open-ended question revealed several issues including limited access to technology, unreliable internet connectivity, language barriers, and the physical and mental challenges of prolonged screen time. In contrast, teachers cited their obstacles such as inadequate pedagogy, limited opportunities for interaction, and the absence of proper assessment and evaluation mechanisms. The absence of strong policy is another major hindrance towards standardizing the implementation digitization across the institutions. 84. 6% of the academicians who were part of the survey felt the need of strong policy to bridge the gap.

At a significance level of 5%, the independent sample t-test conducted on faculty members has determined a statistically significant correlation between gender and technology adoption among the teachers. So, the reluctance to the utilization of available technology should be bridged through gender inclusivity. 25.6 % of the teachers mentioned that their college has adopted blended learning, which is a combination of online and in-person teaching methods. 39.6 % of the teachers said that the most used method in their institution is "chalk and talk," 14.2 % only use few ICT tools in the classroom, 20.6 % emphasis on practical classes, which involve hands-on learning experiences. Hence the current study claims that the implementation of online education is still in its infancy stage. There are several areas that need improvement to support online education. These areas include infrastructure, policy formation at both the institutional and government level, and adequate training for faculty to adapt to this change in teaching modality.

Development of technical skill enhancement workshops catering to both faculty and students are highly essential as per 84.6 % of the respondents to unleash the maximum potential of digitization of the education sector. When 15 % of the faculty members who were part of the survey opted a neutral stand the remaining 85 % of the respondents highlighted the need

for such training. 83.2% of the respondents felt digitization of libraries has enabled them to have more and easier access to information. Geographical differentiation in accessing technology still prevails as a hindrance and even the income of the faculty members has a significant relation to the adoption of digital teaching learning process. While network issues are still a major concern for the rural sector [9], the urban sector draws the attention towards the non-availability of professional platforms to conduct examinations as another challenge. 73.6 % academicians used Google meet as a platform for online classes, while all of them used free online employment interview platforms to conduct examinations. 81.4 % of them highlighted the need for advanced platform for examination. Hence transition to digital mode needs to be a holistic approach integrating infrastructure development, gender inclusivity, income advancement to attain & continuously access available technology and adequate skill enhancement training to adopt newer technology [10].

3.3 Four factor adaptability model for adoption of technology at higher education sector

Considering all these responses of factor and percentage analysis, the researchers developed a four-factor adaptability model Figure 2 for the implementation of digital learning in the higher education sector. Factor 1 is related to transforming the infrastructure at both the faculty and student levels. This may involve updating physical facilities, such as classrooms and laboratories, as well as adopting new technologies and teaching methodologies. The goal of this factor is to be focused on improving the overall educational experience for students and faculty. Factor 2 is focused on empowering institutions to promote gender inclusivity. This factor suggests that institutions should work to create a positive attitude towards gender inclusivity and ensure that technology is accessible to everyone regardless of gender. The goal of this factor is to create an environment where everyone feels welcome and supported regardless of their gender identity.
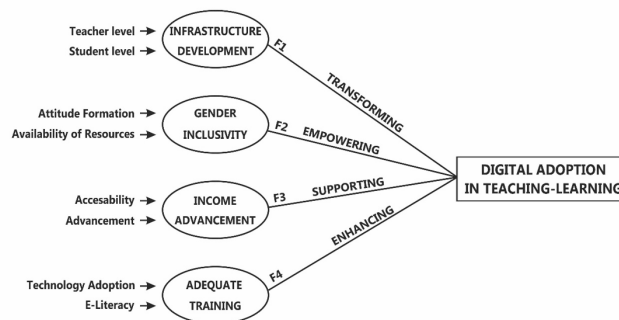

Fig 2. Four factor adaptability model

Factor 3 focuses on the relation to income and personal accessibility to technology. This factor acts as a supporting agent to the individuals and suggests that individuals with higher incomes are more likely to have access to and be able to afford the latest technology, which may be a barrier for those with lower incomes. This factor implies that institutions or organizations should consider how they can help bridge this gap and ensure that technology is accessible to everyone regardless of their income level and make technology more accessible to everyone to improve adoption rates.

Given that technology is constantly advancing, it's essential to continuously improve technical skills. Therefore, Factor 4 addresses the importance of prioritizing sufficient training to facilitate the integration of new innovations in the education sector. This includes implementing e-literacy programs that can help create a secure digital learning environment.

4 Conclusion

This study revealed that the current state of digital learning adoption in most higher education institutions in South India is in its early stages. According to the respondents, no institution has fully embraced digital teaching-learning methods. Presently, technology adoption in higher education is limited to offering a few online courses, incorporating ICT in classrooms, and providing online certificate programs. The majority of academicians rely on learning management systems (LMS) and Google Classroom for content delivery. The use of mobile applications for interpersonal and group communication is the most prevalent form of technology usage among both academicians and students. The study identified several challenges, including infrastructural issues, gender and economic inequalities in technology adoption, and lack of adequate training. To address these challenges, a proposed four-factor model is suggested through this study. It is crucial for the government, NGOs, and

technology giants in India to empower academicians through regular support in order to bridge the gap between academia and industry.

Furthermore, the researcher envisions future research that utilizes learning analytics and data mining techniques to gain insights into student behaviors, engagement patterns, and learning trajectories in online courses. Such studies can greatly assist academicians in improving their instructional design and increasing student engagement. Further studies are also essential to create strong policies at both the institutional and government level.

References

1) World Economic Forum. The COVID-19 pandemic has changed education forever. 2020.
2) Government of India. National education Policy. 2020.
3) Reddy P, Sharma B, Chaudhary K. Digital literacy: A review of literature. *International Journal of Technoethics*. 2020;11(2):65–94. Available from: http://dx.doi.org/10.4018/ijt.20200701.oa1.
4) Warschauer M. Electronic literacies: Language, culture, and power in online education. London, England: Routledge. 1998. Available from: http://dx.doi.org/10.4324/9781410604682.
5) Livingstone S. Critical reflections on the benefits of ICT in education. *Oxford Review of Education*. 2012;38(1):9–24. Available from: http://dx.doi.org/10.1080/03054985.2011.577938.
6) Cranfield DJ, Tick A, Venter IM, Blignaut RJ, Renaud K. Higher Education Students' Perceptions of Online Learning during COVID-19—A Comparative Study. *Education Sciences*. 2021;11(8):403. Available from: https://doi.org/10.3390/educsci11080403.
7) Zalat MM, Hamed MS, Bolbol SA. The experiences, challenges, and acceptance of e-learning as a tool for teaching during the COVID-19 pandemic among university medical staff. *PLOS ONE*. 2021;16(3):e0248758. Available from: https://doi.org/10.1371/journal.pone.0248758.
8) Kline P. An Easy Guide to Factor Analysis. London, England: Routledge. Routledge. 2014. Available from: http://dx.doi.org/10.4324/9781315788135.
9) Challenges and Opportunities of Teaching and Learning in Higher Education with Special Reference to COVID-19 Pandemic: A Global Perspective Sheeraz Ahmad Dar, Rukhsana Bashir. *The International Journal of Indian Psychology*. 2023;11(1). Available from: https://doi.org/10.25215/1101.153.
10) Zalat MM, Hamed MS, Bolbol SA. The experiences, challenges, and acceptance of e-learning as a tool for teaching during the COVID-19 pandemic among university medical staff. *PLOS ONE*. 2021;16(3):e0248758. Available from: https://doi.org/10.1371/journal.pone.0248758.