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A Study of Teachers' Adaptability Towards Digital Education System: An Empirical Study in Higher Education Perspective.

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Abstract
The acceleration in the progress of digital technology has brought about a great change in the environment for higher education. This study seeks to examine the adaptability of teachers towards digital education systems, and more specifically, their ability to implement new technologies into their teaching approaches and the overall education system. With digital platforms becoming more and more effective in the process of teaching, it becomes imperative and critical to get insights into how educators adapt and adhere to the new tools. This may be the determining factor of improved teaching efficacy and better student outcomes. Digital education adaptation also involves the assimilation of multidimensional knowledge and attitudes from basic digital literacy to advanced teaching methods which employ digital technologies to enhance learnizng results. Teachers' capability of using these tools knowledgeably is critical not only in teaching but also in generating interactive and exciting learning experiences that meet the diversity of students. This study aims to determine teacher adaptability to better understand how educational institutions may provide more support to their teachers in the transition to more digital-centric approaches in teaching, and in order to enhance the education system further. A sample of 251 respondents was collected from teachers of private and public schools. The variables that study Teachers' Adaptability Towards Digital Education System are Technological Proficiency & Innovation, Pedagogical Beliefs, Resource Availability, and Professional Development.

Keywords: Digital Education, Teacher Adaptability, Higher Education, Digital Competence, Teaching Methods

Introduction

With the transition to the digital education system being a major challenge in higher education nowadays, this shift needs special attention. This shift was brought about by global events such as the COVID-19 pandemic, which, in turn, emphasised the need for the education system to adapt. For teachers to be able to take advantage of digital education platforms, there needs to be more than just technical capacity. The ability to adapt to digital education involves comprehensive changes in approaches to teaching, communication and interaction with students, within various dimensions. This study aims to explore the adaptability of teachers within higher education to these digital systems, which is a fast-growing subject of interest and importance.

Digital education has come to be an important disruptive element of the learning experience, being the factor that allows more inclusion and flexibility. However, the capacity of these systems to perform well is mostly determined by the ability of the educators to engage with and utilise these digital platforms efficiently. As higher educational institutions are revising their programs to provide students with more hands-on experience, understanding the factors that influence teacher adaptability is becoming a necessity. This includes exploring components such as technological competence, perception about using technologies, support structures available as well as the general effects of the digital tools on teaching methods.

The COVID-19 pandemic resulted in a fast transition to digital learning in higher education, and so, the role of teaching staff in the transformation to digital was necessarily demonstrated. The conditions for online teaching were established but they were sufficient for digital competencies and infrastructure. A first-order change was the process of transformation. Part of the answer is to provide funding for infrastructure and support, as well as the leadership from institution management, in order to form the digital competence and pedagogical repertoire of teaching staff, which will contribute to the faster progress of digital transformation in higher education. Despite the fact that the educators possessed basic digital competencies, they appeared to be lacking higher level competencies which are necessary for the more advanced online teaching methods, and this could be interpreted that further training and support is required (Väljataga et al., 2020).

Adaptability is the capacity of teachers to change their teaching strategies, tools, and methods by taking into consideration the peculiar requirements of online education platforms. It consists of a composite of both hard and soft skills varying from elementary digital literacy, to advanced interactive and instructive competencies. The shift to digital education is not just a mere technological update but is a pretty radical change in the framework of education which demands teachers to reconsider their roles and responsibilities entirely and the ways in which they teach. There is a huge need for teacher trainers to detect the potential digital resources in the field of education and to try and apply them in their own teaching contexts. This kind of understanding can fuel motivation through the demonstration of specific, effective, and discipline-oriented examples provided by seasoned teachers. The place of teacher educators is key to figuring out how digital technology can be well-adapted to fulfil learning requisites over diverse disciplines in higher education (Amhag et al., 2019). The pandemic has made the education system to be challenged in a test kind of way, this is a problem, especially in third-world countries with few resources and terrible infrastructure. Hence, governments intervene to foster digital transformation in HEIs to mitigate this issue. Political support, technological enhancements, and creative solutions are all necessary to ensure that the stream of information is uninterrupted and all the educational challenges are addressed (Mishra et al., 2020).

Literature Review

The integration of digital tools in higher education is reshaping the educational landscape, aligning it with the rapid technological advancements characteristic of the fourth Industrial Revolution. This transformation is not only about adopting new technologies but also involves a holistic change in teaching methodologies, administrative procedures, and the cultural context of educational institutions (Alenezi, 2023). As digital education systems become more prevalent, understanding how teachers adapt to these changes is crucial for improving educational outcomes and preparing students for the modern workforce.

A foundational aspect highlighted by Vaskov et al. (2021) is the necessity for teachers in higher education to possess a broad set of digital competencies. These include cognitive, socio-psychological, organisational, and communicative skills, which are essential for effective teaching in the digital age. Despite high levels of digital literacy, university teachers often exhibit scepticism towards technological innovations, a phenomenon that might stem from lower trust in new technologies compared to younger generations. This reluctance can hinder their engagement with digital educational environments, impacting the overall quality of education.

Teachers' digital competence is essential for effectively integrating technology into teaching practices. As highlighted by Basilotta-Gómez-Pablos et al. (2022), many educators perceive their digital competence as low, especially in areas critical for assessing and enhancing educational practices. This perception underscores the importance of ongoing professional development. Continuous training is advocated as a fundamental component of professional development for university teachers, enabling them to keep pace with evolving technological demands and ensuring that they can effectively meet the challenges of contemporary educational environments.

Mei et al. (2019) support the notion that while many teachers use digital tools for basic tasks, there exists a subset of educators who employ these technologies innovatively to enhance activity, variation, and commitment in their teaching. This innovative use not only refines their teaching methodologies but also encourages a deeper reflection on their practices both during the planning and post-teaching phases.

The study by Martín-Gutiérrez et al. (2022) further explores post-pandemic learning scenarios, emphasizing the urgent need for educators to acquire relevant digital competencies to navigate effectively within institutions that are undergoing digital transformations. Similarly, Mitrofanova (2020) proposes that preparing future teachers for these challenges involves developing new educational programs that focus on digital skills, suggesting the introduction of "Digital Didactics" to enhance educators' proficiency in navigating digital platforms. Digital tools offer a myriad of opportunities to reimagine how education is delivered. Innovations such as augmented reality (AR), virtual reality (VR), and artificial intelligence (AI) have the potential to revolutionize educational experiences by creating immersive and interactive learning environments. These technologies can simulate complex real-world scenarios that were previously inaccessible to students, providing them with experiential learning that enhances understanding and retention of knowledge. However, effectively integrating these advanced technologies requires not only technical skills but also a deep pedagogical understanding and creativity from educators. Training programs can thus be designed not just to enhance technical proficiency but also to encourage innovative thinking and experimentation in pedagogical practices.

Kumar et al. (2022) identified factors such as perceived usefulness, institutional support, and ease of use that significantly influence teachers' satisfaction and their continuance intention to use online teaching methods. This highlights the critical role of teachers' satisfaction in the adoption and sustained use of e-learning systems. Complementarily, Gupta et al. (2021) discuss the potential of cloud-based e-learning systems in creating sustainable blended learning environments, though they acknowledge barriers to adoption that must be addressed. Despite challenges, such as barriers to adoption, the advantages of cloud computing outweigh the drawbacks, indicating its potential for creating sustainable blended learning environments in higher education. Efforts to expand adoption are crucial for realizing the full benefits of cloud computing in education

The transition to digital learning environments also demands a reconsideration of the structure and function of higher education institutions (HEIs). This is another critical aspect of digital transformation in education is ensuring digital equity. This means providing equal access to technology and digital resources to all students, regardless of their socioeconomic background, geographic location, or disabilities. Institutions need to consider strategies to overcome the digital divide, such as providing subsidized devices, ensuring high-speed internet access, and creating accessible learning materials that meet diverse needs, including those of students with disabilities. This approach not only promotes inclusivity but also ensures that all students can benefit from digital advancements in education. As SAYKILI (2019) points out, the adoption of digital tools and applications like hybrid learning environments, massive online open courses (MOOCs), and informal learning platforms are contributing to this new educational paradigm. This paradigm extends learning beyond traditional classroom settings and throughout individuals' lifetimes, supporting more flexible and accessible learning opportunities.

Teachers' restrained attitude towards digital technologies is attributed to various factors, including negative past experiences, lack of awareness about their potential benefits, or resistance to change. It is proposed to transition from a technocratic model of digitalization to a sociocultural dimension, aiming to change teachers' and students' attitudes towards digital technologies and foster a more positive perception of their usage. An effective system of internal control, based on key indicators of digitalization risks, should form the foundation of educational management systems at universities, ensuring the security and sustainability of the digitalization process.(Yureva et al., 2020)

YILDIZ (2022) underlines the necessity for concerted efforts to enhance teachers' digital competencies in regions like Northern Cyprus, emphasizing the importance of active engagement in the digital transformation process to ensure the delivery of quality education. Lastly, demographic factors also play a role in technology adoption, as Sharma & Srivastava (2019) observe that factors like age, gender, work experience, and educational background influence teachers' behavioural intentions toward using technology, underscoring the complexity of integrating technology in educational settings.

Objective

For identifying "A Study of Teachers' Adaptability Towards Digital Education System".

Study's Methodology

251 respondents are considered for this study which was collected from teachers of private and public schools. Random sampling method was used to collect data and examined by "Explanatory Factor Analysis" for results.

Findings of the Study

Below table shows demographic details of participants it shows that 50.99% are male, and 49.01% are female participants. Regarding age of the respondents, 40.24% are between 25 to 30 years, 30.28% are 30 to 35 years, and 29.48% are above 35 years of age. About Types of Schools, Private schools are 54.98%, and Public Schools are 45.02%.

Details of Participants

Variable	Participants	% age
Gender of Participants		
Male	128	50.99%
Female	123	49.01%
Total	**251**	**100**
Age in years		
25 to 30	101	40.24%
30 to 35	76	30.28%
Above 35	74	29.48%
Total	**251**	**100**
Types of Schools		
Private schools	138	54.98%
Public Schools	113	45.02%
Total	**251**	**100**

"Factor Analysis"

"KMO and Bartlett's Test"

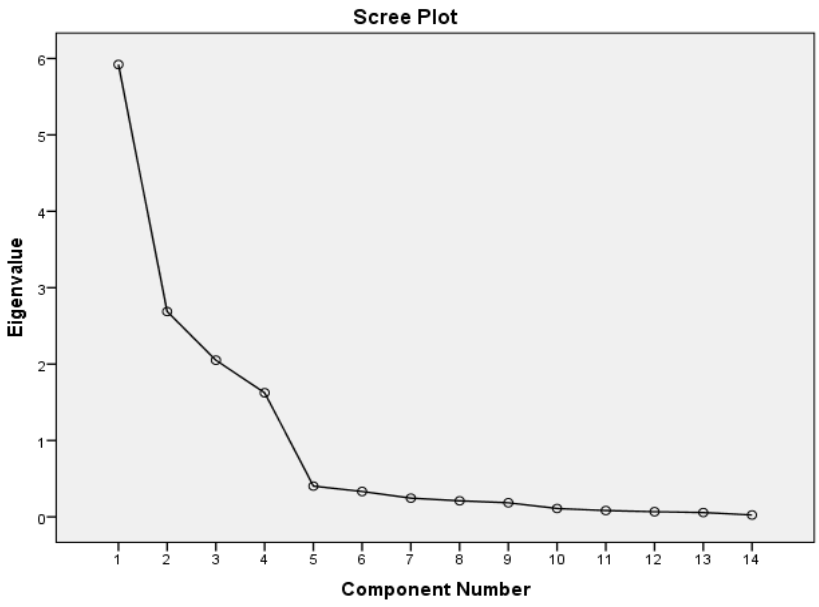
"Kaiser-Meyer-Olkin Measure of Sampling Adequacy"		.802
"Bartlett's Test of Sphericity"	"Approx. Chi-Square"	4071.448
	df	91
	Significance	.000

"KMO and Bartlett's Test", value of KMO is.802

"Total Variance Explained"

"Component"	"Initial Eigenvalues"			"Rotation Sums of Squared Loadings"		
	"Total"	"% Of Variance"	"Cumulative %"	"Total"	"% Of Variance"	"Cumulative %"
1.	5.921	42.294	42.294	**3.798**	27.128	27.128
2.	2.687	19.194	61.487	**3.576**	25.542	52.670
3.	2.051	14.647	76.135	**2.495**	17.824	70.493
4.	1.624	11.602	87.737	**2.414**	17.244	**87.737**
5.	.403	2.877	90.614			
6.	.332	2.371	92.985			
7.	.245	1.752	94.737			
8.	.210	1.500	96.237			
9.	.185	1.320	97.557			
10.	.110	.785	98.342			
11.	.083	.593	98.935			
12.	.068	.484	99.419			
13.	.056	.403	99.822			
14.	.025	.178	100.000			

All the four factors are making contribution in explaining total 87.737% of variance. The variance explained by Technological Proficiency & Innovation is 27.128%, Pedagogical Beliefs is 25.542%, Resource Availability is 17.824%, and Professional Development, is 17.244%.



ScreePlot

"Rotated Component Matrix"

S. No.	Statements	Factor Loading	Factor Reliability
	Technological Proficiency & Innovation		**.980**
1.	Teachers who are comfortable with technology tend to adapt more easily	.959	
2.	Proficient teachers are often more willing to explore new tools and platforms	.954	
3.	The integration of technological tools in education is reshaping the educational landscape	.941	
4.	Proficiency enables them to keep pace with evolving technological demands	.940	
	Pedagogical Beliefs		**.958**
1.	Teachers who believe in the value of integrating technology are more likely to adopt	.946	
2.	People see technology as a tool to enhance learning rather than a distraction or hindrance	.917	
3.	Advanced technologies need not only technical skills but also a deep pedagogical understanding	.891	
4.	Shift to digital education systems requires a reevaluation of pedagogical strategies	.890	
	Resource Availability		**.895**
1.	Adequate access to technology resources, such as devices and internet connectivity is essential	.903	
2.	Teachers in areas with limited resources may face greater challenges	.871	
3.	There is a huge need for teacher to detect potential digital resources in the field of education	.860	
	Professional Development		**.865**
1.	Professional development opportunities focused on digital pedagogy can empower adoption	.906	
2.	Workshops, and online courses can help develop skills needed to integrate technology	.892	

3.	Adaptability can be fostered through targeted support including professional development	.811	

Factors and the associated variables

The first factor of the study is Technological Proficiency & Innovation, the variables included under this factor are Teachers who are comfortable with technology tend to adapt more easily, Proficient teachers are often more willing to explore new tools and platforms, The integration of technological tools in education is reshaping the educational landscape, and Proficiency enables them to keep pace with evolving technological demands. Pedagogical Beliefs is the second factor, it includes variables like Teachers who believe in the value of integrating technology are more likely to adopt, People see technology as a tool to enhance learning rather than a distraction or hindrance, Advanced technologies need not only technical skills but also a deep pedagogical understanding, and Shift to digital education systems requires a reevaluation of pedagogical strategies. The third factor is Resource Availability, the variables it includes are Adequate access to technology resources, such as devices and internet connectivity is essential, Teachers in areas with limited resources may face greater challenges, and There is a huge need for teacher to detect potential digital resources in the field of education. Professional Development is the last factor, its variables are Professional development opportunities focused on digital pedagogy can empower adoption, Workshops, and online courses can help develop skills needed to integrate technology, and Adaptability can be fostered through targeted support including professional development.

"Reliability Statistics"

"Cronbach's Alpha"	"Number of Items"
.888	14

Total reliability of 14 items that includes variables for A Study of Teachers' Adaptability Towards Digital Education System is 0.888

Conclusion

The transition towards digital education systems in higher education presents both significant opportunities and notable challenges. As higher education continues to navigate the complexities of the digital age, the adaptability of teachers remains a pivotal factor in determining the effectiveness of educational outcomes and the preparedness of students for a technology-driven world. There is a necessity for educators to not only develop digital competencies but also to cultivate a mindset that embraces continuous learning and innovation. The rapid pace of technological change demands that teachers remain agile, adapting their methodologies and approaches to leverage digital tools effectively. This adaptability is not innate but can be fostered through targeted support from educational institutions, including professional development programs, access to technological resources, and a supportive teaching culture that encourages experimentation and feedback. Educational leaders play a crucial role in shaping policies and frameworks that support teachers in their digital journeys. By providing robust infrastructure, ongoing training, and a culture that values and rewards innovation in teaching, institutions can significantly enhance the adaptability of their faculty. This support is essential not only for overcoming resistance to technological changes but also for ensuring that digital tools are used to their full potential to enhance student learning experiences. the shift to digital education systems requires a reevaluation of pedagogical strategies to ensure they are aligned with the capabilities and demands of modern technology. This alignment involves understanding not just the technological aspects but also the socio-cultural dimensions of education in the digital era. Teachers must navigate these dimensions thoughtfully, ensuring that technology enhances rather than hinders the educational process. The future of higher education hinges significantly on our ability to adapt teaching practices to meet the challenges and opportunities presented by digital education systems. Moving forward, it will be imperative for both educators and educational institutions to embrace change, seek innovation, and continuously strive for excellence in teaching and learning through the effective use of digital technologies. The variables that study Teachers' Adaptability Towards Digital Education System are Technological Proficiency & Innovation, Pedagogical Beliefs, Resource Availability, and Professional Development.

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