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THE DIGITAL LITERACY PARADOX IN HIGHER EDUCATION: CULTURAL ATTITUDES, TECHNOLOGICAL ACCESS, AND EDUCATIONAL EQUITY IN A GLOBAL CONTEXT

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Abstract

The objective of this study was to investigate the impact of digital literacy (DL), technology access (TA) and cultural attitudes (CA) on education equity (EE) with the mediating role of digital platforms usefulness (DPU). The population of this study were students and teachers in higher education institutes. Using the purposive sampling technique, this study collected a sample of 395 respondents from Asia, Africa, Europe and North Africa. For statistical analysis, the study used JASP Statistical Analysis tool that is an open-source programs for regression analysis. The study found that DL, TA and CA have a significant impact on DPU. The study also reported the significant effect of TA and CA on EE, while it reported an insignificant impact of DL on EE. However, the study confirmed a significant mediating role of DPU for the impact of DL, TA and CA on EE. The study has theoretical as well as practical implications for Africa, Asia, Europe and North America.

Keywords: Education Equity, Digital Literacy, Technology Access, Cultural Attitudes, Digital Platform Usefulness.

1. INTRODUCTION

The rapid digitalization of higher education has introduced both unprecedented prospects and profound confronts for universities and learners worldwide (Sha'ar et al., 2025). As online learning platforms, virtual classrooms, and AI-assisted educational tools become increasingly integrated into academic systems, the expectation for students and educators to possess strong digital competencies has intensified (Aborisade et al., 2025). According to Adarkwah (2024), this shift has revealed a critical practical problem: the unequal distribution of digital resources, skills, and cultural acceptance of digital learning methods. While digital technologies promise to democratize knowledge and bridge geographic barriers, disparities in digital literacy (DL), access to reliable technology, and culturally influenced attitudes towards online education have produced uneven educational experiences across different regions and societies (Adekunle et al., 2022). In much portions of the world, especially in lower-income or traditionally conservative cultural contexts, limited access to digital infrastructure and resistance to technology-mediated education persist (Agasisti et al., 2023). This imbalance threatens not only to disadvantage individuals in their academic pursuits but also to widen existing inequalities in the global higher education landscape.

The consequences of these digital disparities extend far beyond technical challenges, as they directly impact the overarching goal of achieving education equity (EE) in the modern era (Agila-Palacios et al., 2022). EE, understood as fair and inclusive access to quality education irrespective of socioeconomic background, geography, or cultural context, is increasingly dependent on digital competencies and resources (Ahmed, 2024). When certain populations lack adequate DL, reliable internet connectivity, or culturally supportive attitudes toward online learning, they face systemic exclusion from vital educational opportunities. According to Akakpo et al. (2025), this can hinder their academic performance, reduce participation in global knowledge exchanges, and limit access to advanced learning resources and professional development opportunities. The result is a growing digital divide not only between countries and regions but also within societies, stratifying educational outcomes along technological and cultural lines (Akman et al., 2023). In this context, the very tools designed to expand access to knowledge risk reinforcing the social and educational inequalities they were intended to resolve.

Recognizing these challenges, a developing body of research has begun to explore the implications of digital transformation for higher education, focusing on DL, infrastructure development, and policy interventions (Akour & Alenezi, 2022). Scholars have examined the effectiveness of online learning platforms, the readiness of educational institutions to adopt digital technologies, and the role of faculty training in facilitating this shift (Alam et al., 2023). Latest investigates have also highlighted the importance of considering cultural attitudes (CA) toward digital learning, noting that societal norms and values significantly shape how educational technologies are received and utilized (AlDahdouh, 2021). Despite these advances, current research remains fragmented, often focusing narrowly on specific regions or technological aspects while overlooking the interplay of cultural, infrastructural, and pedagogical factors. Moreover, much of the existing literature prioritizes technological access and skill acquisition without fully addressing how these variables intersect with cultural perspectives and broader equity outcomes (Aldreabi et al., 2025). This research gap calls for a more integrated, comparative approach that examines how DL, technological access, and CA collectively influence EE across diverse global contexts.

In response to this need, the present study aims to investigate the DL paradox in higher education by analyzing the combined effects of digital competencies, technological access, and CA on perceived EE. Drawing on comparative data from multiple regions with varying levels of socioeconomic development and digital infrastructure, this research seeks to provide a nuanced understanding of how these factors interact to shape educational experiences in digitally mediated learning environments. Specifically, the study examines the mediating role of digital platform usefulness, the perceived value and effectiveness of digital learning platforms. By integrating cultural, infrastructural, and pedagogical dimensions, this research contributes both theoretically and practically to the field of digital education studies. Theoretically, it extends existing digital culture discourse by framing DL not merely as a technical skill set but as a culturally mediated practice embedded in sociotechnical systems. Practically, the study advances actionable insights for policymakers, educators, and institutional leaders seeking to design inclusive and context-sensitive digital education strategies. Hence, it addresses a timely and globally relevant issue: how to harness the potential of digital transformation to promote not undermine equity in higher education.

2. REVIEW OF LITERATURE

DL means having the services to effectively practice technology, and the knowledge and assistances to do so safely and responsibly (Baroudi et al., 2022). The awareness about digital use of platforms is necessary for the students as their personality is influenced by it. According to Apairach (2023), when the students are motivated to learn better in the educational institutions, their attitude to adopt digital learning method is shaped by their personality. However, prior literature highlighted that when the students have limited understanding about their learning, it is responsibility of the teachers to provide them digital learning skills related training. It is a useful method to improve the overall performance of the students. While Bennett et al. (2022) discussed that when the students are positively motivated to use digital learning skills in their education, their performance is improved. Hence, the students are required to sincerely understand the need of their education with digital technology.

H1: There is a relationship between digital literacy and digital platforms usefulness.

Buenestado-Fernández et al. (2023) discussed that an rightful education system offers every student with the support and resources they need to reach their full potential, no matter what their personality is regarding the background education. According to Boté-Vericad (2021), the students can improve their effectiveness in learning when they have knowledge to use digital skills. While Breen et al. (2023) discussed that the motivation to students can improve their learning behaviour that results in advancement of EE. Accordingly, Cabero-Almenara et al. (2021) addressed that when the students have awareness about DL, their working style is improved which advanced their behaviour and skills for strategic performance. In accordance with previous studies, Bruckhaus et al. (2024) also highlighted the goal of EE in the modern time can be achieved because of digital scholarship skills training to the learners. When the students are motivated to learn, their behaviour is improved and productivity in their performance is achieved.

H2: There is a relationship between digital literacy and education equity.

According to Budai et al. (2023), the access to technology is necessary for the students to improve their overall performance. When the students are highly motivated to achieve their goals, they should learn the modern use of tools. In the advancement of technology era, prior literature discussed that the students should learn the interface and interaction with peer with the help of online platforms. A prior study highlighted that it is imperative for the students to improve their learning capabilities that can be possible with the help of modern use of digital technologies. However, Romero and Bobkina (2021) reported that the limited approach to further the education behaviour of pupils is not sufficient in the modern time, and the teachers should be responsible for providing technology related education to the students. While Begum and Elahi (2022) also highlighted that if the students have no awareness about the modern use of technology, it is a hurdle in their way of performance improvement. The study Deehan and Deehan (2024) pointed out that the learning of students and advancement in digital technology can improve their understanding of better use of technology for education. In the educational context, Chaw and Tang (2024) highlighted that the students should be able to use internet for surfing and obtaining information. Meanwhile, El Messaoudi (2024) highlighted that if there is no focus on the digital technology related awareness of the students, it becomes problematic to improve their performance critically.

H3: There is a relationship between technology access and digital platforms usefulness.

According to SerrÃ et al. (2023), the equity in the education is achieved when the students are supported with the help of digital technology to achieve their goals. However, Connor et al. (2021) pointed out that if the students have limited access to modern technology, it is not easy for them to achieve the goals of significant educational equity. Nevertheless, Encheva et al. (2023) pointed out that when the students have awareness about the modern use of technology, their skills should be furnished which is critical in advancement and learning. Evenstein Sigalov and Cohen (2025) asserted that technology access (TA) can improve educational environments and online learning modules can stimulate the knowledge in better way. Therefore, the advancement in education and equity for it is achieved when the students are supported sufficiently for improving their learning performance (Eybers & Muller, 2024). The study Farsawang and Songkram (2023) discussed that access to modern technology is a significant aspect in enhancing the overall behaviour of the students. Prior literature also highlighted that the modern learning modules should be introduced to students in different stages to improve their behaviour for learning with the help of digital technology. Hence, government level policies to provide easy access to technology can help the students in advancement of their behaviour and digital learning skills.

H4: There is a relationship between technology access and education equity.

Based on findings of Grosseck et al. (2023), it can be stated that preserve teachers' cultural intelligence affects their attitudes towards cultural education.

According to a prior study, the culture of learning has a sizable role in assumption of modern technology in learning. The students of rich cultural education have great importance for technology and using online platforms for learning. However, Arthi and Gandhimathi (2024) discussed that when the students are less motivated in learning, their overall behaviour is shaped by their performance. In previous studies, Gogus et al. (2024) concluded that when students are out of their culture to improve their performance for better outcomes, they can achieve their goals in better way. However, Gómez-Galán et al. (2024) reported that when the pupils are less prompted to further their performance and knowledge, it becomes challenging for them to strategically advance their performance. Hence, a significant level of understanding is essential to better the concert of students and shape their cultural understanding.

H5: There is a relationship between cultural attitudes and digital platforms usefulness.

Grosseck et al. (2023) highlighted that when the students are positive about their learning, it becomes effective for them to improve their performance. According to Gu and Huang (2022), the equity related to education shapes the behaviour of students and they can learn better when they have positive approach to get good education. A prior study highlighted that when learning is improved for the students, they can develop better attitude towards their performance. The study Gómez-Galán et al. (2024) discussed that EE is necessary, but the students should have positive attitude towards their learning. Dianova and Schultz (2023) pointed out that the higher level of involvement of students into their learning shape their behaviour positively which have a substantial effect on their accomplishment.

H6: There is a relationship between cultural attitudes usefulness and education equity.

Digital platforms operate continuously and are accessible regardless of time zone or geographic location. This boosts user engagement by enabling real-time interactions and transactions (Gómez-Galán et al., 2021). Furthermore, digital platforms also streamline business processes and automate complex tasks, reducing the need for extensive manual labor, minimizing operational costs, and improving resource management. According to Frolova and Rogach (2021), digital platforms significantly influence learning behavior and affect students' motivation and knowledge growth. According to Haddade et al. (2024), digital learning platforms enable interactive, personalized learning experiences for students and educators. Gunton (2022) discussed that the use of modern technology forms can help to improve the education quality. Therefore, DPU is critical for EE.

H7: There is a relationship between digital platforms usefulness and education equity.

DL comprises the ability to find, evaluate, create, and communicate information using digital technologies (Chikasha, 2022). According to Farsawang and Songkram (2023), it is necessary to support the students regarding the adaption of digital learning. The responsibility of peers is to teach one another in case of need, as it can help to adopt the use of digital technologies learning module easily. A prior study highlighted that if the students are not properly supported for the advancement in the use of modern tech, it becomes hurdle for them to improve their behaviour in learning. Therefore, a little level of focus by the students on the digital technologies can reduce their awareness and productivity (Alnasib, 2023). Hence, the students should be highly motivated to use the modern technology and large language modules to improve their understanding and learning.

H8: There is a mediating role of digital platforms usefulness in the relationship between digital literacy and education equity.

According to Aziz and Hossain (2024), one of the most substantial advantages of technology in education is that it provides students with an ocean of information at their fingertips. Furthermore, Encheva et al. (2023) discussed that digital learning tools and digital technologies have broken down geographical barriers and provided access to educational resources for students. The use of modern technology should be according to the better understanding of the students (Ayalon & Aharony, 2024). According to Evenstein Sigalov and Cohen (2025), when the students are positively motivated to learn new skills and techniques, it becomes effective for them to achieve success in learning of technology. While SerrÃ et al. (2023) stated that the equal level of education for all students is possible when they are motivated and self-learning about the use of modern technology. Therefore, the learning of modern technology use is necessary for the students to get equal level of education.

H9: There is a mediating role of digital platforms usefulness in the relationship between technology access and education equity.

While the study Ariya et al. (2025) discussed that technology adoption is required for the students of every culture to improve their performance in productive way. According to Romero and Bobkina (2021), when the students of every culture are positive to adopt technology, they can develop their attitude in better way which shapes their learning and strategic performance. The study Assefa et al. (2025) pointed out that the learning of students for fair use of technology is

critical in the modern time that has capacity to boost the performance of students. Hence, Awashreh (2025) recommended that technology related teaching is necessary for the students to improve their understanding for the use of technology. It becomes effective when the students are learning in new educational settings (Dianova & Schultz, 2023) and their performance is improved as compared to other students. Therefore, the adoption of technology and training to use technology can boost the performance of students.

H10: There is a mediating role of digital platforms usefulness in the relationship between cultural attitudes and education equity.

The framework of this study is based on independent variables, mediating variable and dependent variables. The model of the study is reported in Figure 1.

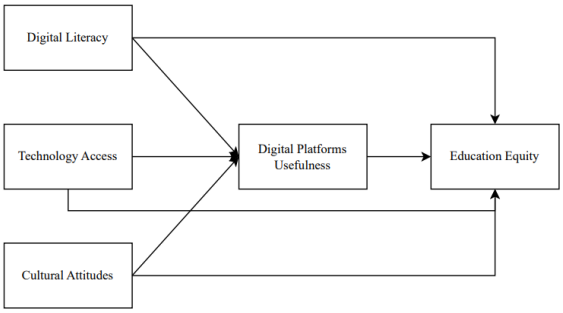

Figure 1: Research Framework.

3. METHODOLOGY

This study employed a quantitative, cross-sectional research design to investigate the relationships between DL, TA, CA, digital platform usefulness, and EE within higher education contexts. A structured questionnaire was developed and distributed to collect primary data from higher education students and faculty members. The study adopted a correlational and regression-based analytical framework to test the proposed hypotheses and examine the mediating effects of key variables.

The population for this study consisted of higher education students and faculty members from universities and colleges across various global regions, including Asia, Africa, Europe, and North America. These participants were selected because of their active involvement in digitally mediated educational environments, where DL, TA, and educational equity are significant concerns. A sample of 395 respondents was obtained using a purposive sampling technique, ensuring representation from diverse demographic and regional backgrounds.

A structured, self-administered questionnaire was designed to collect data on the study variables. The questionnaire was divided into two sections: the first section gathered demographic information such as gender, age, education level, and region, while the second section included standardized items measuring the key constructs of the study Digital Literacy (DL), Technology Access (TA), Cultural Attitudes (CA), Digital Platform Usefulness (DPU) and Education Equity (EE).

The collected data were coded and analyzed using JASP Statistical Analysis (Murad et al., 2024), an open-source statistical analysis software known for its user-friendly interface and robust statistical tools. Descriptive statistics, including frequencies and proportions, were first calculated to summarize the demographic profile of the respondents. To test the study's hypotheses, regression analysis was performed to assess the relationships between independent, mediating, and dependent variables. Additionally, mediation analyses were conducted using the bootstrapping technique available in JASP to examine the indirect effects of mediating variables on EE. The results were interpreted based on significance levels ($p < 0.05$).

4. DATA ANALYSIS *AND FINDINGS*

The demographics data of this study based on the respondents' profile is reported in Table 1. The data discussed that there were 51% male and 49% female participants in the study. Furthermore, 28% respondents were from age group 18-22 years, 44% were from age group 23-27 years, 19% were from age group 28-32 years and 10% were in age group of 33 years and above. Regarding the education level, 24% of the respondents were undergraduate, 50% were postgraduate while 25% had doctoral degrees. Finaly, 18% of the respondents were from Asia, 35% were from Africa, 24% were from Europe and 23% were from North America. The profile of respondents is shown in Table 1.

Table 1: Demographics.

Variable	Level	Counts	Proportion
Gender	Male	200	51%
	Female	195	49%

Age Group	18–22 years	111	28%
	23–27 years	173	44%
	28–32 years	73	19%
	33 years and above	38	10%
Education Level	Undergraduate	96	24%
	Postgraduate	195	50%
	Doctoral	104	26%
Region	Asia	72	18%
	Africa	140	35%
	Europe	93	24%
	North America	90	23%

In the descriptive statistics, the study first focused on mean and standard deviation analysis. The mean, frequently referred to as the average, is one of the simplest and most commonly used measures of central tendency in statistics. The mean value ±3 is acceptable when a five-point Likert scale is used to collect the data. The study found the mean value was significant. Standard deviation, on the other hand, is a measure of dispersion or variability within a dataset. The value of standard deviation close to 1 is considered significant. Hence, the study also found that standard deviation of the data was significant.

Furthermore, the study checked skewness and kurtosis of the data. Skewness is a measure of symmetry, or more precisely, the lack of symmetry. A distribution, or data set, is symmetric if it looks the same to the left and right of the center point. Kurtosis is a measure of whether the data are heavy-tailed or light-tailed relative to a normal distribution. That is, data sets with high kurtosis tend to have heavy tails, or outliers. Data sets with low kurtosis tend to have light tails, or lack of outliers. The findings of skewness and kurtosis achieved recommended thresholds respectively. Hence, the normality of research data was established (Ramadan & Ramadan, 2025). The study also analyzed the data and all 395 responses were valid, without any missing value. The descriptive statistics are reported in Table 2.

Table 2: Descriptive Statistics.

	DL	TA	CA	DPU	EE
Valid	395	395	395	395	395
Missing	0	0	0	0	0
Mean	3.041	3.068	2.967	2.975	2.980
Std. Deviation	1.270	1.299	1.259	1.292	1.252
Skewness	-0.002	0.012	0.170	0.083	0.132
Std. Error of Skewness	0.123	0.123	0.123	0.123	0.123
Kurtosis	-1.067	-1.181	-1.113	-1.156	-1.060
Std. Error of Kurtosis	0.245	0.245	0.245	0.245	0.245
EE = Education Equity, DL = Digital Literacy, TA = Technology Access, CA = Cultural Attitudes and DPU = Digital Platform Usefulness					

Furthermore, this study investigated covariance in the data. A covariance is a number that indicates to what extent two or more variables are linearly related. In contrast to a (Pearson) correlation, however, a covariance depends on the scales of both variables involved as expressed by their standard deviations. The findings of covariance were significantly achieved as the findings were between ±1. The results of covariance analysis are reported in Table 3.

Table 3: Covariance.

	DL	TA	CA	DPU	EE
DL	0.613	0.084	0.062	0.085	0.892
TA	0.084	0.688	0.053	0.050	0.923
CA	0.062	0.053	0.585	0.124	0.984
DPU	0.085	0.050	0.124	0.669	0.020
EE	0.892	0.923	0.984	0.020	0.568
EE = Education Equity, DL = Digital Literacy, TA = Technology Access, CA = Cultural Attitudes and DPU = Digital Platform Usefulness					

The study also analyzed the findings of Pearson' correlation analysis. The Pearson correlation coefficient is a correlation coefficient that measures linear correlation between two sets of data (Benesty et al., 2009). It is the ratio between the covariance of two variables and the product of their standard deviations; thus, it is essentially a normalized measurement of the covariance, such that the result always has a value between −1 and 1. The findings of Pearson' correlations reported in Table 4 confirmed that the variables are significantly correlated with one another.

Table 4: Pearson's Correlations.

Variable		DL	TA	CA	DPU	EE
DL	n					
	Pearson's r					
	p-value					
TA	n	395				
	Pearson's r	0.657				
	p-value	< .001				
CA	n	395	395			
	Pearson's r	0.664	0.644			
	p-value	< .001	< .001			
DPU	n	395	395	395		
	Pearson's r	0.661	0.625	0.691		
	p-value	< .001	< .001	< .001		
EE	n	395	395	395	395	
	Pearson's r	0.561	0.567	0.624	0.63	
	p-value	< .001	< .001	< .001	< .001	
EE = Education Equity, DL = Digital Literacy, TA = Technology Access, CA = Cultural Attitudes and DPU = Digital Platform Usefulness						

Finally, the findings of regression analysis were conducted to test the relationship between variables based on the formulated hypotheses (see Figure 2). H1 is accepted and the study found that there is a relationship between DL and DPU. While H2 is rejected and the study reported that there is no relationship between DL and EE. However, H3 is accepted by reporting that there is a relationship between TA and DPU. Furthermore, H4 is accepted highlighting that there is a relationship between TA and EE. Meanwhile, H5 is accepted reporting that there is a relationship between CA and digital platforms' usefulness. While H6 is also accepted

confirming that there is a relationship between CA and EE. Finally, H7 is accepted by reporting that there is a relationship between DPU and EE. The findings are reported in Table 5.

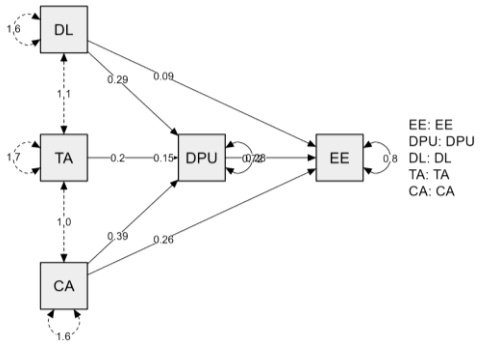

Figure 2: Regression Analysis.

EE = Education Equity, DL = Digital Literacy, TA = Technology Access, CA = Cultural Attitudes and DPU = Digital Platform Usefulness.

Table 5: Direct Effects.

Paths			Estimate	Std. Error	z-value	p
DPU	→	EE	0.282	0.053	5.301	< .001
DL	→	EE	0.091	0.054	1.675	0.094
TA	→	EE	0.151	0.051	2.977	0.003
CA	→	EE	0.260	0.056	4.681	< .001
DL	→	DPU	0.285	0.049	5.821	< .001
TA	→	DPU	0.198	0.047	4.231	< .001
CA	→	DPU	0.386	0.049	7.920	< .001

EE = Education Equity, DL = Digital Literacy, TA = Technology Access, CA = Cultural Attitudes and DPU = Digital Platform Usefulness

In addition, the mediating hypotheses were also tested in this study. H8 is accepted reporting that there is a mediating role of DPU in the relationship between DL and EE. Similarly, H9 is accepted while reporting that there is a mediating role of TA in the relationship between DL and EE. Finally, H10 is accepted by confirming that there is a mediating role of CA in the relationship between DL and EE. The findings are reported in Table 6.

Table 6: Indirect Effects.

Indirect Paths					Estimate	Std. Error	z-value	p
DL	→	DPU	→	EE	0.081	0.021	3.919	< .001
TA	→	DPU	→	EE	0.056	0.017	3.307	< .001
CA	→	DPU	→	EE	0.109	0.025	4.405	< .001

EE = Education Equity, DL = Digital Literacy, TA = Technology Access, CA = Cultural Attitudes and DPU = Digital Platform Usefulness

5. DISCUSSION AND CONCLUSION

This study conducted statistical analysis to investigate the relationship between variables. For this purpose, regression analysis method was used. H1 is accepted and the study found that there is a relationship between DL and DPU. Aldreabi et al. (2025) also supported the findings and reported that DL can better help to understand the usefulness of digital platforms. Furthermore, Al-Hattami (2025) discussed when the DL is appropriate, it helps to use digital platforms in the educational institutions. However, Baber et al. (2022) discussed that the need of DL can improve the working of students and teachers when they are able to use the modern platforms for the purpose of education. Alsmari (2021) in addition, discussed that the successful use of digital platforms is possible with the help of DL. Hence, there is need to focus on DL while incorporating digital platforms in learning.

While H2 is rejected and the study reported that there is no relationship between DL and EE. Baker et al. (2021) pointed out that DL can improve the quality of education which ensures the transparency in knowledge distribution. While Atinafu (2021) discussed that when appropriate measures are taken for information sharing and education management, a significant level of work is required to ensure everyone has DL. According to Chikasha (2022), the knowledge about digital platforms use improves the educational effectiveness which is supportive for advancement in educational development. On the other hand, Apairach (2023) pointed out that digital platforms related literacy should be prime objective the institutions to educate the students. Hence, the relationship between DL and EE is contrasted by the existing studies.

However, H3 is accepted by reporting that there is a relationship between TA and DPU. Awashreh (2025) pointed out that when there is access to technology, the learning performance of the students can be improved in a better way. Furthermore, Connor et al. (2021) recommended that the students should have access to technology in higher education which shapes their learning method and understanding of knowledge in smart way. While Deehan and Deehan (2024) discussed that TA can shapes the underlying structure of knowledge dissemination which can help students to access the correct information. In addition, Arthi and Gandhimathi (2024) pointed out that knowledge dissemination and technology sharing can become a significant factor in advancement of knowledge and improves the usefulness of digital platforms.

Furthermore, H4 is accepted highlighting that there is a relationship between TA and EE. Prior literature added to the knowledge that when the technology is available and integrated into the higher education, it can improve the information sharing to the students. The study Cabero-Almenara et al. (2021) pointed out that TA helps to develop significant educational equity which is a way forward for advancement in

knowledge. The study Breen et al. (2023) pointed out that education can be deliberately available to the students when the access to technology is improved for the students. While prior literature also discussed that the students must have understanding about the use of technology that is critical for their advancement in learning and performance.

Meanwhile, H5 is accepted reporting that there is a relationship between CA and digital platforms' usefulness. The study Arandas et al. (2024) discussed that the culture of students plays a significant role in their learning and critical performance. According to Bruckhaus et al. (2024), most of the students are motivated by their culture of learning and their knowledge acquisition is shaped by their culture. While Ariya et al. (2025) highlighted that the influence of culture is partial on the students, rather their effectiveness in working can improve their understanding and knowledge. However, Bekmanova et al. (2021) pointed out that cultural understanding and knowledge sharing can become a significant factor in improving digital platforms' usefulness which shapes the attitude of students.

While H6 is also accepted confirming that there is a relationship between CA and EE. The study Arslantas et al. (2024) discussed that cultural attitude of the students helps them to obtain the education. However, Assefa et al. (2025) pointed out that when the culture is positive for learning new knowledge, people are highly concerned about educational advancement. The study Bennett et al. (2022) discussed that EE is necessary in every culture because it improves the understanding of students and shapes their learning behaviour. However, Almeida and Costa (2023) discussed that when the appropriate educational opportunities are available, it becomes easy for students to improve their learning while the influence of culture is also available.

While H7 is accepted by reporting that there is a relationship between DPU and EE. The findings of Alnasib (2023) also supported this study while reporting that if the students have information about the usefulness of digital technologies, their learning abilities and improves which are necessary for educational equity. Furthermore, Boté-Vericad (2021) discussed that when the students are highly motivated for their learning, it shapes their behaviour to learn the modern use of technology. According to Chaw and Tang (2024), the appropriate use of technology can stimulate the educational and learning in the students which is necessary for their productive behaviour. However, Cheng and Gonzalez-Ramirez (2021) reported that if the students are less motivated for improvement in their education, their learning opportunities are decreased as they have no intention to learn the modern use of technology.

Accordingly, H8 is accepted reporting that there is a mediating role of DPU in the relationship between DL and EE. The study Blackmon and Major (2023) stated that DL helps the students to improve their understanding of useful of digital technology. In addition, Budai et al. (2023) stated that when the students have knowledge about the appropriate use of digital technology, the EE is developed. Although this relationship was new in the body of knowledge, but it has a significant support from the existing studies (Begum & Elahi, 2022).

Similarly, H9 is accepted while reporting that there is a mediating role of DPU in the relationship between TA and EE. The study Buenestado-Fernández et al. (2023) discussed that access to modern technology improves the understanding of students and teachers for the usefulness of DL. In addition, Aziz and Hossain (2024) discussed that when DL is possibly achieved, it helps the improve the learning of the students where the information is critically shared to them. Even the mediating role of TA is new in the literature, but the support from existing studies strengthens this relationship.

Finally, H10 is accepted by confirming that there is a mediating role of DPU in the relationship between cultural attitude and EE. According to Baroudi et al. (2022), CA of the students improves their acceptance of the usefulness of digital technologies. However, Balić et al. (2024) stated that when the students are highly motivated for the use of digital technologies, they get the education in the better way. Hence, the DPU mediates the relationship between CA and EE. Although the mediating role of DPU is new in the body of literature, but this relationship is significantly supported by the existing studies (Ayalon & Aharony, 2024).

5.1. Theoretical and Practical Implications

The research contributes valuable insights to the developing body of knowledge on digital culture, DL, and EE in higher education. The confirmation of significant relationships between DL, TA, CA, and digital platform usefulness reinforces the notion that digital transformation in education is shaped by both technical and socio-cultural factors. Notably, the absence of a direct relationship between DL and EE challenges existing theoretical assumptions, suggesting that digital competencies alone are insufficient to achieve equitable educational outcomes without supportive infrastructural and cultural conditions. The mediating roles identified in this study advance socio-technical theory by illustrating

how digital platforms act as crucial intermediaries in the relationship between individual capabilities and structural outcomes. These results also extend DL frameworks by highlighting the indirect pathways through which digital competencies influence EE. Moreover, by integrating CA into the analysis, the study affirms the importance of culturally situated digital practices, supporting calls from digital sociology and ethnography scholars for a more contextualized understanding of digital education. Overall, the research offers a comprehensive, empirically grounded model that deepens theoretical understanding of the complex interactions between digital culture and educational equity in the digital era.

From a practical standpoint, this study offers several actionable insights for policymakers, higher education administrators, and educators seeking to enhance EE through digital transformation. The strong associations between TA, CA, and digital platform usefulness underscore the importance of investing not only in digital infrastructure but also in culturally responsive digital education strategies. Institutions should prioritize expanding access to reliable technology and high-quality digital resources, particularly in underserved regions, to create more equitable learning environments. Furthermore, the significant mediating role of digital platform usefulness indicates that merely providing digital tools is not enough; platforms must be user-friendly, relevant, and tailored to diverse cultural and educational contexts to fully support equitable outcomes. The rejection of a direct link between DL and EE highlights the need for holistic approaches that integrate digital skill development with improvements in access, platform design, and cultural inclusivity. Additionally, education leaders should implement professional development programs that address both technical training and cultural competency to better equip faculty for delivering inclusive, effective digital education. By adopting these measures, institutions and policymakers can better leverage digital innovations to narrow educational disparities and foster inclusive, sustainable higher education systems in the digital age.

5.2. Limitations and Future Directions

Even though the study contributed significantly to the literature and provides practical implications, there are some limitations of this research. At first, the collection of only quantitative data is methodological limitations of this study which reduces its generalization as theoretical aspects with qualitative data are not discussed in detail. The study recommends scholars to use qualitative data in future research to improve their findings. Moreover, the study reported that there is no relationship between DL and EE. However, the previous studies in literature reported this relationship as acceptable. Hence, it is required for the future studies to replicate this study and investigate this relationship in a different context. In addition to it, the study recommends the future studies should focus on control variables such as age and gender to analyze the relationship between DL and education. It would be a noteworthy contribution by the future studies to the body of knowledge while supporting this relationship.

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