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Digital Literacy Skill Development among Students in Higher Education: An Empirical Analysis of Challenges and Barriers

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Abstract- ***Digital literacy has become an essential competency for students in the modern educational environment. Despite the increasing integration of digital technologies in education, several challenges hinder students from effectively developing digital literacy skills. This study examines the major barriers faced by students in acquiring digital literacy competencies. Data were collected from 564 respondents and analyzed using descriptive statistics and mean rank analysis. The findings reveal that poor internet connectivity and financial constraints are the most significant challenges affecting digital literacy development. Inadequate training in advanced digital tools, stress and distraction associated with digital learning, language barriers, and limited access to digital devices also influence students' digital learning experiences. The study highlights the need for improved digital infrastructure, affordable access to technology and comprehensive digital literacy training programs to foster an inclusive and effective learning environment.***

Keywords: Digital Literacy, Digital Learning, Higher Education, Digital Divide, Student Competency, Technology Adoption

I. INTRODUCTION

The rapid advancement of information and communication technologies has transformed the educational landscape, making digital literacy an indispensable skill for students. Digital literacy encompasses the ability to access, evaluate, create and communicate information using digital technologies effectively and responsibly. Educational institutions increasingly rely on digital platforms for teaching, learning, and assessment, particularly in the post-pandemic era.

However, disparities in access to technology, digital skills, and infrastructure continue to create challenges for students. Understanding these barriers is essential for policymakers, educators and institutions seeking to promote equitable and effective digital learning opportunities.

This study investigates the challenges and barriers encountered by students in developing digital literacy skills and explore factors that may hinder their participation.

II.REVIEW OF LITERATURE

Digital literacy has emerged as a crucial competency for higher education students in the digital age. With the increasing integration of technology into teaching and learning, researchers have emphasized the importance of developing digital competencies to ensure effective participation in academic and professional environments. The following studies provide insights into various dimensions of digital literacy and digital competence among learners.

Warschauer (2004) examined the relationship between technology and social inclusion and argued that the digital divide extends beyond physical access to technology. The study emphasized that social, economic and educational factors influence individuals' ability to effectively utilize digital resources.

Martin (2006) proposed a European framework for digital literacy and described digital literacy as the awareness, attitude and ability of individuals to appropriately use digital tools and resources for communication, learning and knowledge creation. The study highlighted the importance of digital literacy in lifelong learning.

Ng (2012) investigated whether digital natives inherently possess digital literacy skills and found that familiarity with digital technologies does not necessarily ensure digital competence. The study emphasized the need to develop technical, cognitive and socio-emotional dimensions of digital literacy among students.

Ferrari (2013) developed the Digital Competence Framework (DIGCOMP) for the European Commission to provide a comprehensive understanding of digital competence. The framework identified key competency areas, including information and data literacy, communication, content creation, safety and problem-solving, which are essential for effective participation in digital environments.

Eshet-Alkalai (2018) presented a revised model of digital literacy and highlighted that digital literacy encompasses cognitive, emotional and social skills in addition to technical abilities. The study emphasized the multidimensional nature of digital literacy and its significance in the digital era.

Voogt et al. (2018) explored the challenges faced by educational institutions in the digital networked world and emphasized the need for learners to acquire twenty-first-century skills, including digital competence.

Van Deursen and van Dijk (2019) examined the changing nature of the digital divide and found that inequalities have shifted from physical access to disparities in the quality and availability of digital resources.

Reddy et al. (2020) measured the digital competency of higher education students and found variations in students' levels of digital competence across different dimensions. The study stressed the importance of enhancing digital skills to improve learning outcomes and preparedness for the digital society.

Bond et al. (2021) investigated emergency remote teaching in higher education during the COVID-19 pandemic and reported that students' readiness and digital competencies played a significant role in their adaptation to online learning environments.

Muthuprasad et al. (2021) examined students' perceptions and preferences regarding online education in India during the COVID-19 pandemic. The findings revealed that access to digital devices, internet connectivity and familiarity with technology significantly influenced students' preferences and experiences with online learning.

Park and Kim (2022) studied the relationship between digital competence and online learning engagement among university students. The study found that higher levels of digital competence positively influenced students' engagement and participation in online learning activities, thereby contributing to better educational outcomes.

III.OBJECTIVES OF THE STUDY

- To examine the major challenges and barriers faced by students in developing digital literacy skills.
- To identify the relative significance of infrastructural, economic, technical, linguistic, and psychological factors influencing digital literacy development among students.

IV.RESEARCH METHODOLOGY

The study adopts a descriptive research design to examine the challenges and barriers influencing digital literacy skill development among students. A structured questionnaire was administered to 564 respondents using convenience sampling.

The questionnaire included statements related to infrastructural, financial, technical, linguistic, and psychological barriers. Responses were measured using a five-point Likert scale. Descriptive statistical tools, including mean scores, standard deviation, and mean rank analysis, were employed to identify and rank the challenges experienced by students.

The findings provide insights into the factors affecting digital literacy development and support recommendations for enhancing digital learning environments.

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V.RESULTS AND DISCUSSION

5.1-Challenges and barriers faced by students in developing digital literacy skills.

Table.no:1 Descriptive Statistics-Mean rank

	N	Minimum	Maximum	Mean	Std. Deviation
Challenges and Barriers Faced - I face difficulty due to lack of proper digital devices.	564	1	5	3.01	1.122
Challenges and Barriers Faced - Poor internet connectivity affects my academic activities.	564	1	5	3.19	1.074
Challenges and Barriers Faced - I lack proper training to use advanced digital tools.	564	1	5	3.16	1.085
Challenges and Barriers Faced - Language barriers restrict effective use of digital platforms.	564	1	5	3.06	1.086
Challenges and Barriers Faced - Financial constraints limit access to digital resources.	564	1	5	3.19	1.096
Challenges and Barriers Faced -I feel stressed or distracted while using digital technologies for learning.	564	1	5	3.15	1.130
Valid N (listwise)	564				

Table no.1shows the descriptive statistics were analysed to identify the major challenges and barriers experienced by respondents while using digital technologies for learning. The mean scores indicate the extent to which respondents agree with each statement, while the standard deviation reflects the variability in responses.

Ranking Based on Mean Scores

Challenges and Barriers Faced	Mean	Std. Deviation	Rank
Poor internet connectivity affects my academic activities	3.19	1.074	1*
Financial constraints limit access to digital resources	3.19	1.096	1*
I lack proper training to use advanced digital tools	3.16	1.085	3
I feel stressed or distracted while using digital technologies for learning	3.15	1.130	4
Language barriers restrict effective use of digital platforms	3.06	1.086	5
Challenges and Barriers Faced	Mean	Std. Deviation	Rank
I face difficulty due to lack of proper digital devices	3.01	1.122	6

*Tie Rank

The findings reveal that poor internet connectivity and financial constraints limiting access to digital resources emerged as the most significant challenges faced by respondents, both recording the highest mean score of 3.19. This indicates that technical infrastructure and economic limitations continue to be major obstacles to effective digital learning.

The challenge of lacking proper training to use advanced digital tools ranked third with a mean score of 3.16, suggesting that many students require additional digital literacy and technical skill development. Similarly, respondents reported experiencing stress or distraction while using digital technologies for learning (Mean = 3.15), highlighting concerns related to concentration, time management, and digital fatigue.

Language barriers obtained a mean score of 3.06, indicating a moderate challenge in accessing and

understanding digital content. The issue of lack of proper digital devices received the lowest mean score (3.01), although the value remains above the neutral point, suggesting that device availability is still a concern for some respondents.

The mean rank analysis indicates that infrastructural and economic factors constitute the most prominent barriers to digital learning among respondents. Poor internet connectivity and financial limitations emerged as the primary challenges, followed by inadequate training in the use of advanced digital technologies.

Psychological factors, such as stress and distraction during digital learning, also represent notable concerns. Although language barriers and lack of digital devices were comparatively less severe, their mean values suggest that these issues continue to affect a considerable proportion of learners. Overall, the findings underscore the need for improved digital infrastructure, financial support mechanisms, and digital competency training to enhance the effectiveness of technology-enabled education.

The study concludes that poor internet connectivity and financial constraints are the most significant barriers affecting students' digital learning experiences. Challenges related to digital skills, stress during online learning, language limitations, and access to digital devices also influence learning effectiveness to varying degrees.

These findings highlight the importance of strengthening digital infrastructure, providing affordable access to digital resources, and implementing training programs that enhance students' technological competencies, thereby fostering a more inclusive and effective digital learning environment.

Educational institutions and policymakers should prioritize the improvement of internet infrastructure and ensure affordable access to digital resources for students. Regular digital literacy training programs should be conducted to enhance students' proficiency in using advanced digital tools and platforms.

Financial assistance schemes, subsidized internet services and device support programs can help reduce economic barriers. Additionally, multilingual digital learning resources and counselling initiatives addressing digital stress and distraction can further improve students' engagement and learning outcomes in technology-enabled education.

VI.CONCLUSION

The study concludes that digital literacy development among students is significantly influenced by multiple barriers, with poor internet connectivity and financial constraints emerging as the most critical challenges. Inadequate training in advanced digital technologies, stress associated with digital learning, language barriers, and limited access to digital devices also affect students' ability to acquire and utilize digital competencies effectively.

Addressing these challenges requires collaborative efforts from educational institutions, governments, and technology providers. Strengthening digital infrastructure, expanding access to affordable technology, and enhancing digital literacy training can contribute to a more inclusive, equitable and effective digital learning ecosystem.

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