

Demographic Differences in Digital Literacy Among Higher Education Students: An Empirical Study

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Abstract—Digital literacy has emerged as a critical competency for students in the technology-driven educational environment. The present study examines the differences in digital literacy levels among higher education students based on demographic factors such as gender, course of study, and locality (urban/rural). The study adopts a descriptive and analytical research design and is based on primary data collected from 564 students through a structured questionnaire. The findings are expected to provide insights into demographic variations in digital literacy and contribute to the development of targeted strategies for enhancing digital competencies among students. The study highlights the importance of promoting inclusive digital learning opportunities to bridge existing disparities and support academic success in higher education.

Index Terms—Digital Literacy, Digital Competencies, Demographic Factors, Technology-Driven Education and Inclusive Digital Learning

I. INTRODUCTION

The rapid advancement of information and communication technologies has transformed the educational landscape, making digital literacy an essential skill for students. Digital literacy encompasses the ability to access, evaluate, create and communicate information using digital technologies effectively. In higher education, digital literacy plays a significant role in facilitating online learning, academic research, communication and knowledge acquisition. However, students' digital literacy levels may vary based on demographic characteristics such as gender, academic discipline and locality. Understanding these differences is important for designing effective educational interventions and promoting equitable access to digital learning opportunities.

II. REVIEW OF LITERATURE

Digital literacy has become an indispensable skill for higher education students in the rapidly evolving digital landscape. The increasing integration of technology into teaching and learning, particularly after the COVID-19 pandemic, has highlighted the importance of students' ability to effectively access, evaluate and utilize digital resources. Several researchers have examined the concept of digital literacy, its dimensions, its role in online learning and its impact on academic performance. The following review presents the findings of earlier studies related to digital literacy among higher education students.

Ng (2012) examined whether digital natives inherently possess digital literacy skills and concluded that familiarity with technology does not necessarily translate into digital competence. The study emphasized the importance of developing technical, cognitive and socio-emotional dimensions of digital literacy among students.

Eshet (2012) proposed a revised model of digital literacy and highlighted that digital literacy encompasses cognitive, emotional and social skills required to function effectively in digital environments. The study suggested that digital literacy is a multidimensional concept extending beyond mere technological proficiency.

Siddiq et al. (2016) conducted a systematic review of ICT literacy assessment instruments and observed considerable variation in the methods used to measure digital literacy. The authors emphasized the need for reliable and comprehensive assessment tools to evaluate students' digital competencies.

Spante et al. (2018) reviewed the concepts of digital competence and digital literacy in higher education research and found inconsistencies in their usage. The study indicated that both concepts involve a combination of technological knowledge, communication skills, and critical thinking abilities necessary for effective participation in digital environments.

Dhawan (2020) discussed the growing significance of online learning during the COVID-19 pandemic and identified digital literacy as an essential prerequisite for successful virtual education. The study emphasized the role of technology in ensuring continuity of education during crisis situations.

Falloon (2020) highlighted the transition from digital literacy to digital competence and proposed a framework that integrates technological, pedagogical and ethical dimensions. The study emphasized the need to equip learners and educators with comprehensive digital competencies for effective participation in modern educational settings.

Nambiar (2020) investigated the perceptions of students and teachers regarding online learning during the COVID-19 pandemic. The findings revealed that access to technology and digital skills significantly influenced the effectiveness of online education and learners' experiences.

Reddy et al. (2020) reviewed the existing literature on digital literacy and concluded that digital literacy is a multidimensional construct with significant implications for education and employability. The study emphasized the importance of promoting digital competencies to meet the demands of the digital age.

Bond et al. (2021) mapped the experiences of higher education institutions during the first global online semester and reported differences in students' readiness and adaptation to online learning environments. The study highlighted the influence of contextual and individual factors on digital engagement.

Muthuprasad et al. (2021) examined students' perceptions and preferences regarding online education in India during the COVID-19 pandemic. The study found that accessibility to digital devices,

internet connectivity and technological familiarity influenced students' acceptance of online learning.

Pokhrel and Chhetri (2021) reviewed the impact of the COVID-19 pandemic on teaching and learning and reported that inequalities in access to digital technologies and varying levels of digital literacy posed significant challenges to educational systems worldwide.

Tang et al. (2021) investigated the impact of digital literacy on academic performance among higher education students and found a positive relationship between digital literacy and academic achievement. The study concluded that students with higher digital literacy levels exhibited better learning outcomes and academic performance.

III. OBJECTIVES OF THE STUDY

- To assess the digital literacy levels among higher education students.
- To analyse the differences in digital literacy levels based on gender, course of study, and locality (urban/rural).

IV. RESEARCH METHODOLOGY

The study adopts a descriptive and analytical research design to examine digital literacy levels among higher education students. Primary data were collected from 564 respondents through a structured questionnaire. Secondary data were obtained from books, journals, research articles, conference proceedings, government reports, and online databases. A convenience sampling technique was employed to select respondents from various higher education institutions in Coimbatore District. Statistical tools such as percentage analysis, descriptive statistics, Independent Samples t-test, and One-Way ANOVA were used to analyse differences in digital literacy levels across demographic groups. The methodology provides a systematic framework for understanding demographic variations in students' digital literacy competencies.

V. RESULTS AND DISCUSSIONS

5.1. Differences In Digital Literacy Levels

Among students based on demographic factors such as gender, course of study and locality

Hypothesis: H_0 :

There is no significant difference in Digital Literacy between the two groups.

Table No:1- Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
						Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df				Lower	Upper
DLAVG	Equal variances assumed	.283	.595	-.255	562	.799	-.11670	.45720	-1.01473	.78134
	Equal variances not assumed			-.257	527.089	.797	-.11670	.45417	-1.00890	.77551

Table No:1 S=shows the result of an Independent Samples t-test which was conducted to determine whether significant differences exist in digital literacy levels between male and female students.

Levene's Test for Equality of Variances

The Levene's Test result shows $F = 0.283$ with a significance value of $p = 0.595$. Since the p-value is greater than 0.05, the assumption of equal variances is satisfied. Therefore, the results under "Equal variances assumed" are considered for interpretation.

T-Test Results

The t-test results indicate that the calculated t-value is -0.255 with 562 degrees of freedom, and the corresponding significance value is $p = 0.799$.

Variable	t-value	df	p-value	Mean Difference
DLAVG	-0.255	562	0.799	-0.117

Since the p-value (0.799) is greater than the significance level of 0.05, the difference between the two groups is not statistically significant. The mean difference of -0.117 indicates only a negligible variation between the groups.

Furthermore, the 95% confidence interval for the mean difference ranges from -1.015 to 0.781, which includes

zero, providing additional evidence that there is no significant difference between the group means.

The Independent Samples t-test revealed no statistically significant difference in DLAVG between the two groups ($t = -0.255$, $df = 562$, $p = 0.799$). Levene's Test confirmed the homogeneity of variances assumption ($F = 0.283$, $p = 0.595$). As the significance value exceeds the 0.05 threshold, the null hypothesis of no difference between the group means is accepted.

This finding suggests that group membership does not significantly influence the respondents Digital Literacy scores.

Since $p = 0.799 > 0.05$, the null hypothesis (H_0) is not rejected. Therefore, no significant difference exists in digital literacy levels between male and female students.

5.2. Differences among the groups with respect to Course of Study, Level of Study and Locality of Residence.

Hypothesis: H_0 :

There is no significant difference among respondents based on Course of Study, Level of Study and Locality of Residence.

Table No:2-ONE WAY ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Course of Study	Between Groups	37.191	67	.555	1.026	.427
	Within Groups	268.462	496	.541		
	Total	305.652	563			
Level of Study:	Between Groups	.875	67	.013	1.065	.347
	Within Groups	6.081	496	.012		
	Total	6.956	563			
Locality of Residence:	Between Groups	23.547	67	.351	.957	.575
	Within Groups	182.105	496	.367		
	Total	205.652	563			

Table no.2 shown the results of One-Way ANOVA to examine whether significant differences exist among the groups with respect to Course of Study, Level of Study and Locality of Residence.

1. Course of Study

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	37.191	67	0.555	1.026	0.427
Within Groups	268.462	496	0.541		
Total	305.652	563			

The ANOVA result for Course of Study shows an F-value of 1.026 with a significance value of 0.427. Since the p-value is greater than 0.05, there is no statistically significant difference among the groups based on Course of Study.

Students from different courses exhibit similar responses and Course of Study does not significantly influence the variable under investigation.

2. Level of Study

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.875	67	0.013	1.065	0.347
Within Groups	6.081	496	0.012		
Total	6.956	563			

The ANOVA result for Level of Study yielded an F-value of 1.065 and a significance value of 0.347. As the p-value exceeds 0.05, the differences among the groups are not statistically significant.

Respondents at different levels of study demonstrate comparable responses, indicating that Level of Study does not significantly affect the variable being analysed.

3. Locality of Residence

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	23.547	67	0.351	0.957	0.575
Within Groups	182.105	496	0.367		
Total	205.652	563			

For Locality of Residence, the F-value is 0.957 with a significance value of 0.575. Since the p-value is greater than 0.05, there is no significant difference among the groups based on locality.

The place of residence does not significantly influence the responses of the participants.

The One-Way ANOVA results indicate that Course of Study ($F = 1.026$, $p = 0.427$), Level of Study ($F = 1.065$, $p = 0.347$) and Locality of Residence ($F = 0.957$, $p = 0.575$) do not produce statistically significant differences among respondents. In all cases, the significance values exceed the 0.05 threshold, suggesting that variations observed among the groups are attributable to random chance rather than systematic group differences.

Hypothesis Testing

Course of Study

Decision: Accepted ($p = 0.427 > 0.05$).

Digital literacy levels do not differ significantly across different courses of study.

Level of Study

H₀: There is no significant difference among respondents based on Level of Study.

Decision: Accepted ($p = 0.347 > 0.05$).

Digital literacy levels are similar across different levels of study.

Locality of Residence

H₀: There is no significant difference among respondents based on Locality of Residence.

Decision: Accepted ($p = 0.575 > 0.05$).

Digital literacy levels do not differ significantly based on locality of residence.

VI. RESULTS AND DISCUSSION

The analysis concludes that there is no significant difference in DLAVG between the two groups considered in the study. The observed mean difference is minimal and statistically insignificant, indicating that respondents from both groups exhibit similar levels of DLAVG. Therefore, group characteristics do not appear to have a meaningful impact on DLAVG in the present study.

The One-Way ANOVA analysis reveals that respondents do not differ significantly with respect to Course of Study, Level of Study, or Locality of Residence. The findings suggest that these demographic characteristics have no substantial influence on the variable under examination. Therefore, the responses of the participants remain relatively consistent across different educational backgrounds, academic levels and residential locations. This indicates a homogeneous pattern of responses among the study participants irrespective of these demographic factors.

The study suggests that higher education institutions should strengthen digital literacy initiatives by providing regular training programs, workshops and hands-on learning opportunities to enhance students' digital competencies. Special attention should be given to students from rural backgrounds and those with lower levels of digital proficiency to ensure

equitable access to digital learning resources. Educational institutions should also improve digital infrastructure, internet accessibility and awareness of academic digital resources such as e-journals, online databases and learning management systems. Furthermore, integrating digital technologies into teaching and learning practices can foster greater student engagement, improve academic outcomes and prepare students for the demands of an increasingly digitalized world.

VII. CONCLUSION

Digital literacy has become an indispensable competency in contemporary higher education, enabling students to effectively access, evaluate and utilize digital information for academic and professional purposes. The study highlights the significance of demographic factors such as gender, course of study and locality in influencing students' digital literacy levels. Understanding these variations is essential for developing targeted educational strategies and fostering inclusive digital learning environments. Enhancing digital literacy among students can contribute significantly to academic success, lifelong learning and career readiness in an increasingly digital society. Therefore, educational institutions and policymakers should prioritize digital literacy development through appropriate infrastructure, training programs, and support mechanisms to ensure equitable and effective participation in the digital age.

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