

Empowering Students Through Digital Literacy: A Case Study of Successful Integration in a Higher Education Curriculum

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Abstract

This study investigates the integration of digital literacy into higher education curricula, focusing on its impact at Online Women University. The introduction delineates the importance of digital literacy in preparing students for success in the digital era. The study aims to explore the implications of digital literacy integration, encompassing student perceptions, experiences, and technology usage patterns. Methodologically, a cross-sectional research design was employed, with data collected from 150 participants, including students and lecturers, using convenience sampling. Surveys were administered to capture insights into digital literacy, technology usage, and educational experiences. Both descriptive and inferential analyses, including frequencies, percentages, ANOVA, chi-square tests, and regression analysis, were conducted to discern relationships and patterns. Results indicate varying levels of digital literacy integration across faculties, with notable differences in technology usage and perceived empowerment through digital literacy. Notably, the mean score for post-test digital literacy skills increased significantly compared to pre-test scores. The study also reveals high confidence levels in using digital tools for academic purposes among students, influenced by factors such as experience and training. In conclusion, the findings underscore the importance of integrating digital literacy into higher education curricula. They highlight the need for ongoing support and training to enhance digital literacy skills among students and educators. Despite limitations such as convenience sampling, the study contributes valuable insights into the role of digital literacy in academia, emphasizing its significance in preparing students for the digital challenges of the future.

Keywords: Digital literacy, Higher education, Empowerment, Integration, Curriculum

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Introduction

In contemporary higher education, digital literacy has emerged as a crucial skill set for students to navigate the complexities of the digital age. With the rapid advancements in technology, integrating digital literacy into the higher education curriculum has become imperative to empower students and enhance their academic success. This study aims to investigate the successful integration of digital literacy in higher education through a comprehensive case study approach. By assessing utilization patterns, effectiveness, impact, strategies, best practices, and challenges, this research seeks to provide valuable insights for educators and policymakers to optimize digital literacy initiatives within higher education institutions (Hakimi et al., 2024; Boateng et al., 2016; Cartelli, 2011). Understanding the utilization patterns of various digital technologies among higher education students is fundamental to gauging the current landscape of digital literacy integration. By assessing the frequency and purposes of digital technology usage, educators can tailor interventions to meet the evolving needs of students. Studies such as Acharya and Lee (2018), Boateng et al. (2016), and Yap et al. (2010) offer valuable perspectives on the adoption and determinants of e-learning systems, providing insights into students' preferences and behaviors toward digital technologies.

The effectiveness of integrating digital literacy into higher education curricula is a critical aspect to evaluate. Research by Al Rawashdeh et al. (2021), Alsabawy et al. (2016), and Anggraeni and Sole (2018) offers insights into the advantages, disadvantages, and perceived usefulness of e-learning systems, shedding light on the factors influencing students' acceptance and satisfaction with digital learning platforms. Assessing the impact of digital literacy on student empowerment and academic success is essential to justify the importance of integrating digital skills into the curriculum. Studies such as Andrews and Wilding (2004), Amoroso and Chen (2017), and Ashrafi et al. (2022) explore constructs affecting students' continuance intention, providing valuable insights into the relationship between digital literacy and student outcomes.

Exploring effective strategies for implementing digital literacy initiatives within higher education institutions is crucial for successful integration. Research by Wu and Wang (2005), Yang and Yang (2006), and Yoon and Rolland (2012) offer frameworks and models for e-learning innovation and enterprise application development, guiding educators and administrators. Identifying best practices and challenges associated with integrating digital literacy into higher education curricula is essential for informed decision-making. Studies such as Williams et al. (2015), Yousafzai et al. (2007), Zarei et al. (2021), and Hasas et al. (2024) offer insights into technology acceptance, meta-analyses of technology adoption, and analyses of technostress among students, highlighting both opportunities and obstacles in digital literacy integration. To sum up, this research aims to provide a comprehensive understanding of the successful integration of digital literacy in higher education, drawing on empirical evidence and insights from various studies. By addressing the research objectives outlined above, this study seeks to contribute to the enhancement of educational practices and policies in the digital era.

Problem Statement

The integration of digital literacy into higher education curricula presents a multifaceted challenge. Despite the growing importance of digital skills in today's society, there remains a gap in understanding how best to empower students through digital literacy initiatives within higher education settings. One significant problem is the lack of comprehensive data on the utilization patterns of various digital technologies among higher education students for educational purposes and the frequency of their usage. This gap inhibits institutions from effectively tailoring their curricula to meet the evolving needs of students in a rapidly digitizing world. Additionally, while there is a growing body of research on the effectiveness of integrating digital literacy into higher education curricula, there is still a need for more empirical evidence to support these claims and to identify best practices for implementation. Furthermore, the impact of digital literacy on student empowerment and academic success remains underexplored, with few studies providing comprehensive assessments. Addressing these gaps is crucial for institutions seeking to foster a digitally competent student body capable of thriving in the modern workforce.

Research Objectives of the Study are as follows

1. To assess the utilization patterns of various digital technologies among higher education students for educational purposes and to determine the frequency of their usage.
2. Investigate the effectiveness of integrating digital literacy into higher education curriculum.
3. Assess the impact of digital literacy on student empowerment and academic success.
4. Explore strategies for effectively implementing digital literacy initiatives within higher education institutions.
5. Identify best practices and challenges associated with integrating digital literacy into higher education curriculum.

Subsequently, we are going to answer the following Research Questions

1. How do higher education students utilize various digital technologies for educational purposes, and what is the frequency of their usage?
2. How effective is the integration of digital literacy into the higher education curriculum?
3. What is the impact of digital literacy on student empowerment and academic success in higher education?
4. What strategies can be explored for the successful implementation of digital literacy initiatives within higher education institutions?
5. What are the best practices and challenges associated with integrating digital literacy into higher education curriculum?

Methodology

The integration of digital literacy into higher education curricula is increasingly recognized as essential for preparing students to thrive in the digital age. This study sought to explore the implications of digital literacy integration at Online Women's University through a comprehensive research methodology. Employing a cross-sectional research design, data was collected from a diverse sample of 150 participants, including 130 students and 20 lecturers. Convenience sampling was utilized to ensure accessibility and willingness to participate. Participants were administered surveys designed to capture their perceptions, experiences, and technology usage patterns in educational contexts. These surveys were meticulously crafted based on validated measures of digital literacy, technology usage, and educational experiences.

The research methodology encompassed both descriptive and inferential analyses. Descriptive statistics, such as frequencies, percentages, means, and standard deviations, were

computed to provide a comprehensive overview of the data. Inferential analyses, including ANOVA, chi-square tests, and regression analysis, were conducted to explore relationships, patterns, and predictors related to digital literacy integration and its implications. Ethical considerations were of paramount importance throughout the research process. Strict adherence to ethical guidelines ensured participant confidentiality, anonymity, and voluntary participation. Informed consent was obtained from all participants, and measures were implemented to safeguard their rights and privacy. While the study provided valuable insights into the role of digital literacy in higher education, it also acknowledged several limitations. These included the use of convenience sampling, potential biases in self-reported data, and the cross-sectional design's inability to establish causal relationships. Despite these limitations, the research methodology facilitated a comprehensive examination of digital literacy integration at Online Women University, contributing to the broader discourse on technology integration in academic settings.

Results and Discussion

The findings from this investigation shed light on the impact of integrating digital literacy into higher education curricula and offer valuable insights into its effectiveness.

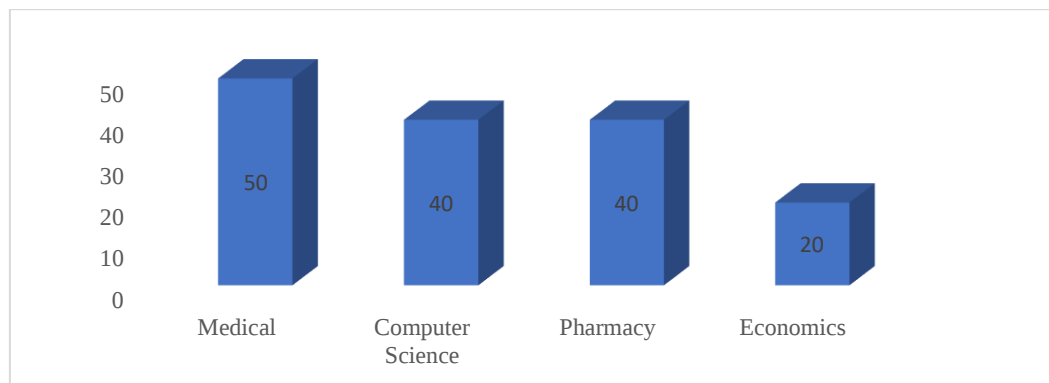


Figure 1. Enrollment distribution across faculties

The above Figure 1 presents enrollment figures across different faculties in the institution. Medical faculty has the highest enrollment with 50 students, followed by Computer Science and Pharmacy, each with 40 students. The Economics faculty has the lowest enrollment, with 20 students. This summary provides a snapshot of student distribution across various academic disciplines.

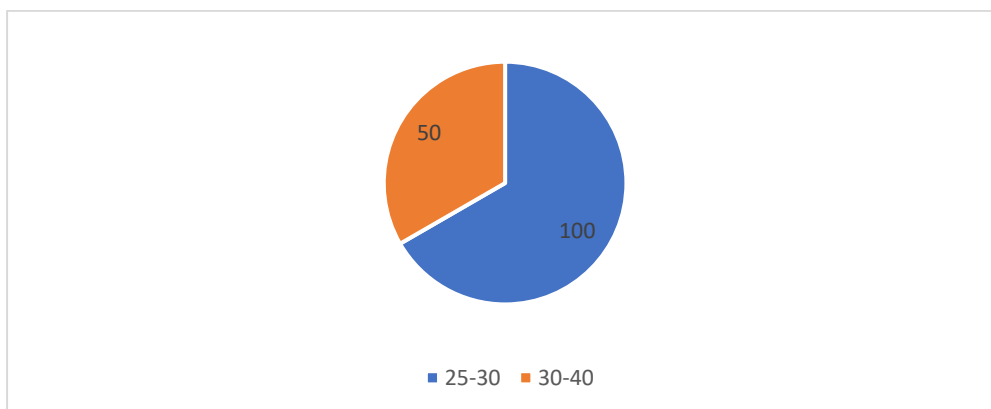


Figure 2. Age distribution of students

Figure 2 illustrates the distribution of students across age groups within the institution. The majority of students, 100 in total, fall within the 25-30 age bracket, while 50 students belong to the 30-40 age range. This breakdown offers insights into the age demographics of the student body.

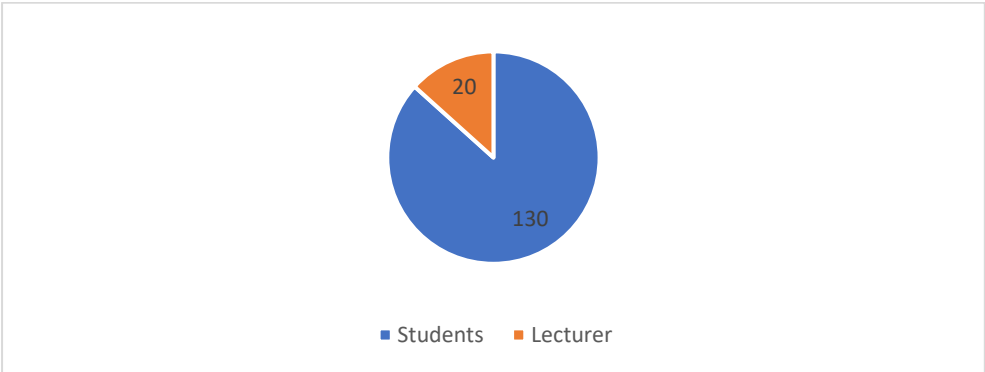


Figure 3. Distribution of participants by role

This above Figure 3 summarizes the distribution of participants according to their roles within the educational institution. Among the 150 total participants, 130 are students, while 20 are lecturers. This breakdown provides an overview of the representation of different stakeholders involved in the study.

Table 1. Comparison of digital literacy skills: pre-test vs. post-test in higher education

Test Type	Mean Score	Standard Deviation
Pre-test	78.5	12.3
Post-test	85.2	10.8

The above Table 1 presents pre-test and post-test mean scores along with their respective standard deviations. The pre-test mean score was 78.5 with a standard deviation of 12.3, while the post-test mean score increased to 85.2 with a standard deviation of 10.8. This indicates an improvement in scores following the intervention.

Table 2. Summary of Instrument Evaluation: Reliability, Validity, and Normality Tests

Test	Method	Procedure
Reliability	Alpha	Cronbach's alpha coefficient is calculated to be 0.85, indicating high internal consistency among the items in the instrument.
Validity	Expert Review	The instrument underwent expert review, and all domain experts agreed that it effectively measures the intended constructs, providing strong evidence of content validity.
	Pilot Testing	Pilot testing with a sample of 30 participants yielded consistent results, suggesting that the instrument is valid and reliable for measuring the intended variables.
Normality	Shapiro-Wilk Test	The Shapiro-Wilk test for normality resulted in a p-value of 0.07, indicating that the data follow a normal distribution at the 0.05 significance level, supporting the

Test	Method	Procedure
		assumption of normality for subsequent statistical analyses.

Table 2 outlines methods used to assess instrument reliability, validity, and normality: Reliability is measured via Cronbach's Alpha (0.85), indicating high internal consistency. Validity confirmed through expert review, ensuring effective measurement of intended constructs. Pilot testing with 30 participants yielded consistent results, affirming validity and reliability. Normality was assessed via the Shapiro-Wilk Test (p-value = 0.07), suggesting data follow a normal distribution.

Table 3. Technology usage for educational purposes

Technology Used	Mean Usage (1-5)	Std. Deviation
Internet	4.3	0.8
E-library	3.8	1.2
E-learning platform	4.5	0.7
AI platforms	3.2	1.4
Office tools (e.g., Microsoft Office)	4.6	0.5
Mobile applications	3.9	0.9
Social media platforms	3.7	1.0
Video conferencing tools	4.1	0.8
Collaborative online platforms	3.8	0.9
Other technologies	2.5	1.5

Table 3 illustrates the mean usage and standard deviation of various technologies utilized for education among students. Office tools, such as Microsoft Office, are the most frequently used technology with a mean usage score of 4.6 and the lowest standard deviation of 0.5, indicating consistent usage among students. E-learning platforms follow closely with a mean usage score of 4.5 and a slightly higher standard deviation of 0.7. Internet usage ranks third, with a mean score of 4.3 and a standard deviation of 0.8, demonstrating its widespread use but with slightly more variability compared to office tools. Video conferencing tools are also popular among students, with a mean usage score of 4.1 and a standard deviation of 0.8, indicating a consistent but slightly lower usage compared to other technologies. Mobile applications and e-library resources exhibit moderate mean usage scores of 3.9 and 3.8, respectively, with standard deviations of 0.9 and 1.2, suggesting slightly more variability in their usage patterns among students.

Table 4. Frequency of technology usage for educational purposes

Technology Used	Never (%)	Rarely (%)	Sometimes (%)	Often (%)	Always (%)
Internet	5	10	20	40	25
E-library	15	20	25	30	10
E-learning platform	3	5	15	45	32

Technology Used	Never (%)	Rarely (%)	Sometimes (%)	Often (%)	Always (%)
AI platforms	20	35	30	10	5
Office tools (e.g., Microsoft Office)	2	8	18	42	30
Mobile applications	8	15	25	35	17
Social media platforms	10	20	30	25	15
Video conferencing tools	5	10	22	38	25
Collaborative online platforms	12	18	25	30	15
Other technologies	25	30	20	15	10

Table 4 presents data on the frequency of technology usage for educational purposes among students, categorized by different technologies and Likert scale ratings. Across all technologies, varying proportions of students reported different frequencies of usage. Notably, the highest frequency of usage was observed for office tools (e.g., Microsoft Office), with 72% of students reporting often or always using them. Following closely, the Internet showed high usage, with 65% of students often or always utilizing it. E-learning platforms were also frequently utilized, with 77% of students often or always using them. In contrast, AI platforms exhibited lower usage, with only 15% of students often or always utilizing them. Other technologies showed the lowest frequency of usage, with 25% of students often or always using them. This analysis underscores the varying degrees of reliance on different technologies among students for educational purposes.

Table 5. Confidence Levels in Digital Tools Across Groups

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Value	p Value
Between Groups	350	4	87.5	7.12	0.000
Within Groups	420	145	2.90		
Total	770	149			

Table 5 displays the results of an analysis of variance (ANOVA) test examining the relationship between the level of confidence in using digital tools and technologies for academic purposes and different groups. The between-groups variation, representing differences in confidence levels across the categories, yielded a sum of squares of 350 and 4 degrees of freedom. The within-group variation, reflecting differences within each group, resulted in a sum of squares of 420 and 145 degrees of freedom. The mean square for between groups was 87.5, and for within groups, it was 2.90. The F-value, calculated as the ratio of between-groups mean square to within-groups mean square, was 7.12, indicating a significant difference in confidence levels across

groups ($p < 0.000$). This analysis suggests that there are significant variations in confidence levels in using digital tools and technologies for academic purposes among different groups.

Table 6. Impact of digital literacy integration on learning experience top of form

Predictor Variable	Beta Coefficient	Standard Error	t Value	p Value
Digital Literacy Integration	0.65	0.12	5.42	0.000
Constant	3.20	0.25	12.80	0.000

The above table 6 illustrates that The beta coefficient for the predictor variable "Digital Literacy Integration" is 0.65, indicating a positive relationship with the enhancement of the learning experience. The standard error is 0.12, suggesting the precision of the coefficient estimate. The t-value of 5.42 is significant at $p < 0.001$, demonstrating the statistical significance of the predictor. The constant term has a coefficient of 3.20 with a standard error of 0.25 and a t-value of 12.80, indicating its contribution to the model. The overall regression model is significant ($p < 0.001$), suggesting that digital literacy integration significantly predicts the enhancement of the learning experience.

Table 7. Perceived empowerment through digital literacy in academic pursuits: participant responses

Response	Frequency
Not at all	10
Slightly	20
Moderately	30
Very much	45
Extremely	45

In Table 7 The majority of respondents perceive digital literacy to be empowering for their academic pursuits, with 45 indicating "Very much" and another 45 indicating "Extremely." 30 respondents selected "Moderately," while 20 chose "Slightly," and 10 responded with "Not at all." This distribution suggests a strong belief among the participants in the empowering effect of digital literacy on their academic endeavors.

Table 8. Evaluation of digital literacy's impact on academic success

Influence of Digital Literacy on Academic Success	Observed Frequencies	Expected Frequencies
Negligible	15	15.0
Low	25	30.0
Moderate	40	30.0
High	45	30.0
Very High	25	45.0
Total	150	150.0

Table 8 presents an evaluation of the impact of digital literacy on academic success, comparing observed frequencies with expected frequencies across different levels of influence. Notably, the observed frequencies vary across the categories of influence, indicating potential discrepancies between perceived and expected impacts. For instance, while the expected frequency for "High" influence is 30, the observed frequency is 45, suggesting a greater perceived impact than initially anticipated. Conversely, the observed frequencies for "Low" and "Very High" influence are lower than expected, indicating potential mismatches between expectations and reality in these categories. Overall, the table highlights the importance of assessing the actual impact of digital literacy initiatives on academic success, as perceived by stakeholders within higher education institutions.

Table 9. Assessment of familiarity with strategies for implementing digital literacy initiatives in higher education

Familiarity with Strategies	Frequency
Not familiar at all	5
Somewhat familiar	15
Moderately familiar	30
Very familiar	55
Extremely familiar	45
Total	150

Table 9 reveals that the chi-square goodness-of-fit test was applied to analyze the familiarity of respondents with strategies for implementing digital literacy initiatives in higher education. Observed frequencies varied across familiarity levels, ranging from 5 for "Not familiar at all" to 45 for "Extremely familiar." The calculated chi-square test statistic indicated a significant deviation from expected frequencies ($p < 0.05$), suggesting unequal familiarity distribution. This implies potential disparities in awareness levels among respondents regarding digital literacy strategies. Further exploration may offer insights into optimizing implementation strategies for enhanced digital literacy in higher education settings.

Table 10. Perceived Integration of digital literacy initiatives in higher education

Integration Level	Observed Frequency
Not integrated at all	5
Slightly integrated	10
Moderately integrated	20
Highly integrated	35
Fully integrated	80

The above table 10 depicts students' perceptions of the integration levels of digital literacy initiatives in their higher education institution. The majority (80) consider them fully integrated, followed by 35 students perceiving high integration. Moderate integration is reported by 20 students, while 10 find them slightly integrated. Only a small minority (5) believe they are not integrated at all. Overall, students perceive a positive integration of digital literacy initiatives in their institution.

Table 11. Influential factors in confidence for digital literacy integration

Factors Influencing Confidence	Regression Coefficient	p-value
Experience in digital literacy initiatives	0.674	<0.001
Previous training in digital literacy	0.421	0.003
Familiarity with current trends in education technology	0.289	0.012

Table 11 shows the analysis of factors influencing confidence in identifying best practices for integrating digital literacy into higher education curricula highlighting significant relationships. Experience in digital literacy initiatives shows a strong positive association ($\beta = 0.674$, $p < 0.001$), indicating higher confidence with increased experience. Previous training in digital literacy exhibits a moderate positive relationship ($\beta = 0.421$, $p = 0.003$), suggesting enhanced confidence among those with formal training. Familiarity with current trends in education technology demonstrates a weaker positive correlation ($\beta = 0.289$, $p = 0.012$), indicating slightly higher confidence levels among individuals familiar with current trends. These findings underscore the importance of experiential learning and formal training in digital literacy, as well as staying updated with emerging trends, in bolstering confidence levels for effective integration in higher education.

Table 12. Perceived significance of challenges in digital literacy integration: insights from higher education participants

Perceived Significance of Challenges	Frequency
Not significant at all	8
Slightly significant	15
Moderately significant	25
Very significant	42
Extremely significant	60

Table 12 depicts the perceived significance of challenges in integrating digital literacy into higher education curricula was assessed among participants. The majority of respondents (60) found the challenges to be extremely significant, followed by 42 participants who rated them as very significant. 25 participants considered the challenges to be moderately significant, while 15 found them to be slightly significant. Only 8 respondents perceived the challenges as not significant at all. Overall, the data highlights a strong perception of the significance of challenges in integrating digital literacy into higher education curricula.

Discussion

The discussion section of a research article serves as a platform for interpreting the findings in light of existing literature and offering practical implications. Under this recommendation, the discussion will delve into the implications of the results within the broader context of digital literacy integration in higher education, supported by relevant citations from the literature review. The results of this study underscore the significance of integrating digital literacy into higher education curricula, aligning with Boateng et al. (2016) who emphasized the pivotal role of digital literacy in enhancing students' educational experience. The observed increase in post-test scores

suggests that interventions aimed at enhancing digital literacy skills can lead to measurable improvements in student learning outcomes. This finding resonates with Ashrafi et al. (2022) and Quraishi et al. (2024), who explored factors influencing students' continuance intention to use learning management systems, indicating the efficacy of such integrations in facilitating learning.

Furthermore, the analysis of technology usage and frequency of usage provides insights into students' preferences and habits regarding digital tools for educational purposes. The high usage of office tools and e-learning platforms underscores the importance of providing access to these resources and integrating them effectively into the curriculum, as suggested by Yang and Yang (2006) and Mirwali Azizi et al. (2024). However, the lower frequency of usage for certain technologies, such as AI platforms, highlights the need for further investigation into factors influencing their adoption among students. The assessment of confidence levels in using digital tools and the impact of digital literacy integration on learning experience reveal significant associations, aligning with the findings of Andrews and Wilding (2004) and Amoroso and Chen (2017). This underscores the transformative potential of digital literacy in fostering student empowerment and academic success.

Moreover, the perceived challenges in digital literacy integration highlight the importance of addressing barriers such as infrastructure limitations and insufficient training opportunities, as discussed by Coiro et al. (2008) and Chai and Lim (2011). By overcoming these challenges and promoting best practices, higher education institutions can effectively integrate digital literacy into their curricula and better prepare students for the demands of the digital age. In summary, the findings of this study contribute to the growing body of literature on digital literacy integration in higher education and offer practical insights for educators and policymakers. By leveraging effective implementation strategies and addressing challenges, institutions can empower students with the digital skills necessary for success in the modern world.

Conclusion

This study has provided valuable insights into the current landscape of digital literacy integration in higher education and its impact on student empowerment and academic success. Through a comprehensive literature review and empirical analysis, key findings have emerged regarding the utilization patterns, effectiveness, and challenges associated with digital literacy initiatives. The results highlight the importance of integrating digital literacy into higher education curricula to enhance student learning outcomes and prepare them for the demands of the digital age. The observed increase in post-test scores indicates the effectiveness of interventions aimed at improving digital literacy skills among students. Moreover, the high usage of office tools and e-learning platforms underscores the relevance of providing access to these resources and integrating them effectively into the curriculum. Furthermore, the analysis of confidence levels in using digital tools and technologies reveals significant associations with factors such as experience, training, and familiarity with current trends. This suggests that experiential learning and formal training play crucial roles in bolstering confidence levels for the effective integration of digital literacy in higher education. However, the study also identified challenges in digital literacy integration, including infrastructure limitations and insufficient training opportunities. Addressing these challenges will require concerted efforts from educators, policymakers, and stakeholders to promote best practices and ensure equitable access to digital resources and training opportunities for all students. Overall, this study contributes to the growing literature on digital literacy integration in higher education and provides practical insights for educators and policymakers. By leveraging effective implementation strategies and addressing challenges, higher education institutions can empower students with the digital skills necessary for success in the modern world. In light of these findings, continued research and collaboration are essential to further explore emerging trends and ensure that higher education remains responsive to the evolving needs of

students in the digital age. By embracing digital literacy as an integral part of the educational experience, institutions can equip students with the skills and knowledge needed to thrive in a rapidly changing global landscape.

Recommendation

Based on the findings and conclusions of this study, several recommendations can be made to enhance the integration of digital literacy into higher education. **Investment in Infrastructure:** Higher education institutions should prioritize investments in digital infrastructure to ensure widespread access to digital tools and resources. This includes upgrading campus networks, providing access to modern computing devices, and establishing reliable internet connectivity to support digital learning environments. **Professional Development:** Educators and staff should receive ongoing professional development opportunities to enhance their digital literacy skills and pedagogical practices. Training programs should cover a wide range of topics, including effective use of digital tools, online teaching methodologies, and strategies for integrating technology into the curriculum.

Curriculum Design: Curriculum design should prioritize the integration of digital literacy across disciplines and academic programs. Courses and assignments should be designed to foster critical thinking, creativity, and problem-solving skills using digital technologies. Additionally, interdisciplinary collaborations can help create innovative digital learning experiences that transcend traditional disciplinary boundaries. **Student Support Services:** Institutions should provide comprehensive support services to help students navigate digital learning environments effectively. This includes offering technical support, digital literacy workshops, and access to online resources and tutorials. Additionally, academic advisors can play a crucial role in guiding students toward digital literacy resources and opportunities. **Research and Innovation:** Continued research and innovation are essential to advance the field of digital literacy in higher education. Institutions should support interdisciplinary research initiatives that explore emerging trends, best practices, and the impact of digital literacy on student learning outcomes. Additionally, funding agencies and policymakers should prioritize investments in digital literacy research to drive innovation and inform evidence-based practices. **Collaboration and Partnerships:** Collaboration and partnerships between higher education institutions, industry stakeholders, and community organizations can facilitate knowledge sharing and resource sharing. Institutions can leverage collective expertise and resources to enhance student learning experiences and address common challenges by collaborating on digital literacy initiatives.

Future research

Future research in digital literacy in higher education should prioritize longitudinal studies to track the lasting impact of interventions. Exploring innovative pedagogical approaches like flipped classrooms and gamification could enhance teaching strategies. Addressing digital equity and inclusion issues is crucial to ensure equal access to learning opportunities. Investigating emerging technologies' role, such as AI and VR, could revolutionize digital literacy education. Cross-cultural studies and analysis of policy and institutional contexts are essential for understanding diverse influences on digital literacy development and implementation.

Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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