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# EXPLORING GENDER PREFERENCES IN THE ADOPTION AND USAGE OF E-LEARNING TOOLS IN SOUTH AFRICAN UNIVERSITIES

Tendayi C. Garutsa<sup>1</sup> and Temitope J. Owolabi<sup>2\*</sup>

<sup>1</sup>North-West University, Department of Sociology, Mafikeng, South Africa.

<sup>2</sup>North-West University, Department of Sociology, Mafikeng, South Africa. Email:  
temitopeowolabi01@gmail.com

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Corresponding Author: Temitope J. Owolabi  
(temitopeowolabi01@gmail.com)

## ABSTRACT

*The rapid integration of e-learning tools into higher education, especially following the COVID-19 pandemic, has redefined pedagogical delivery. However, concerns persist regarding equitable access and usage of these technologies, particularly across gender lines in developing contexts such as South Africa. This study investigates gender-based preferences and disparities in the adoption and use of instructional technologies among university students in the Humanities. Drawing on both qualitative and quantitative data, with 358 respondents across humanities, the research explores factors such as digital access, pedagogical preferences, device ownership, and sociocultural influences. The findings indicate that while male and female students generally display positive attitudes toward e-learning, their engagement patterns differ. Male students tend to gravitate toward exploratory, interactive tools, whereas female students show a preference for structured, reflective platforms like Learning Management Systems. Structural barriers, including limited access to laptops and reliance on smartphones among female students, further complicate equal participation. Socioeconomic conditions and societal norms also influence confidence and digital competence, affecting female students disproportionately. Despite increasing digital literacy among younger cohorts and institutional efforts to bridge access gaps, subtle gendered experiences persist in the e-learning environment. The paper argues for gender-responsive policies and targeted support systems to promote equitable digital participation. By highlighting these disparities and contextual factors, the study contributes to the broader discourse on inclusive digital education and provides recommendations for South African higher institutions to foster gender equity in instructional technology deployment.*

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**KEYWORDS:** Digital Inclusion, E-Learning Tools, Gender Disparities, Gender Preference, Higher Education, Instructional Technology, Learning Management Systems (LMS), South Africa.

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## 1. INTRODUCTION

The incorporation of e-learning instruments into higher education has proved more and more essential in recent times, especially since COVID-19 outbreak that jolted the global education system into rapid digital transformation. E-learning tools like Learning Management Systems (LMS), video lectures, discussion forums and collaborative platforms have redefined pedagogical engagement by facilitating access to learning resources on flexible and remote platforms (Dhawan, 2020). Yet, there is concern about the equitable adoption and use of such tools, across gender lines, especially in developing contexts, including South Africa, where digital access and socio-cultural factors intersect to influence learning experiences.

Gender differences in the use of technology have been well documented in educational studies. Research indicate that male learners are more likely to have previous experience of technology and hence may have a real or perceived head start in accessing of digital platforms (Mlambo-Ngcuka, 2020). In contrast, female students are often confronted with digital literacy, confidence and societal stereotypes that may impede women's effective use of instructional technologies (UNESCO, 2022). These disparities can lead to unequal learning outcomes, reinforcing existing gender gaps in educational attainment and digital competence.

The transition to e-learning in South African universities has had both positive and negative sides. Although digital tools have been readily adopted by a significant portion of students for academic purposes, structural inequalities including access to devices, internet connection and technical support still influence the adoption of e-learning (Maphalala & Adigun, 2021). Importantly, how gender matters in this digital turn is a topic that is still under-addressed, particularly in the Humanities where the incorporation of digital platforms may not be as natural to its practice as when compared with that of STEM. Recent evidence suggests male and female students usually display positive attitudes about e-learning tools but differences exist regarding the preferred platforms or utilization of e-learning tools (Kaufman et al., 2011; Jhan et al., 2022). In practice, these differences are often minor, context dependent and shaped but the specific course content and their past experiences with technology, and level of institutional support.

Grasping these gendered experiences is essential to create inclusive educational policies and interventions that build equitable digital engagement. Without intentional policies to address

these gaps, female students may continue to be marginalized within the digital learning space, stifling their own academic progress and future participation in the digital environment (Isaacs, 2020). Thus, this paper intends to examine gender preferences related to e-learning tool usage and adoption amongst South African university students, specifically, students studying related Humanities. Through the examination of both quantitative and qualitative data, the research aims to provide South African institutions with recommendations on how to improve gender inclusion in their digital educational offerings.

## 2. LITERATURE REVIEW

The expansion of digital technologies in post-secondary education has sparked interest among researchers to explore the differentials in access and use. Gender differences in the use of instructional technologies have quickly become a major focus area (Bervell & Umar, 2021). Groups of researchers have noted the progress made in actively promoting inclusive digital education at the local, regional, and global scales, but there remain gender differences in student capabilities, experiences, and practices with e-learning technologies that are often subtle or unnoticed, especially in Africa. This review summarizes some recent literature on gendered experiences with e-learning and is organized around four areas including student engagement, student access, student technological capability, and student sociocultural factors in the South African university context.

### 2.1. Gender And Digital Access

Access to digital devices and internet connectivity is foundational to effective participation in e-learning environments. Without reliable access to the necessary technological infrastructure, students are significantly disadvantaged in their ability to engage with digital content, participate in virtual classrooms, and utilize online learning platforms. While global trends indicate that gender disparities in access to information and communication technologies (ICTs) are gradually narrowing, regional and country-specific studies reveal that significant gaps still persist—particularly in sub-Saharan Africa. According to the GSMA Mobile Gender Gap Report (2022), This discrepancy reflects deep-rooted structural and cultural barriers, including limited financial autonomy, lower digital literacy among women, and restrictive gender norms that influence technology use.

Within the context of South African higher

education, institutional provisions such as university computer labs, campus Wi-Fi, and subsidized internet packages have aimed to promote equitable access. However, these structural provisions are not sufficient to eliminate disparities entirely, as students' everyday access is heavily dependent on personal devices. A key finding by Bozalek et al. (2021) indicates that socioeconomic factors still influence students' ability to fully engage with e-learning, as the affordability of laptops, tablets, and reliable home internet remains a barrier, particularly for students from lower-income households.

A comparative study by Czerniewicz et al. (2020) across multiple South African universities found near-universal access to at least one device among students. However, notable gendered patterns emerged: male students were significantly more likely to own laptops or tablets, while female students disproportionately relied on smartphones. This is problematic, as many educational technologies—such as interactive simulations, collaborative editing platforms, and high-resolution video lectures—are not optimized for mobile interfaces. The reliance on smartphones among female students may therefore lead to limited interactivity, slower navigation, and reduced functionality, ultimately affecting the quality of their learning experience. These findings underscore the importance of addressing both infrastructural access and device compatibility in efforts to ensure gender-equitable participation in digital learning.

## **2.2. Gender Differences In E-Learning Tool Usage**

A central concern in the literature is whether males and females use instructional technologies differently, and if so, what factors shape these patterns of engagement. Several studies have proposed that male students are generally more inclined toward tools requiring higher technical engagement, such as programming environments, simulations, or gamified learning systems. Female students, on the other hand, are often found to prefer content consumption-oriented tools like video lectures, online discussion forums, and digital reading platforms. Tsai et al. (2021) explain this difference by noting that males typically report greater confidence in handling interactive technologies and tend to pursue tools that offer exploratory, hands-on learning experiences. In contrast, females often express a preference for structured environments that foster reflection, collaboration, and clarity, such as Learning Management Systems (LMS) and multimedia content

designed to guide learning in a sequential manner.

However, this gender-based dichotomy is increasingly being challenged. Albelbisi and Yusop (2019), in their study based on the Technology Acceptance Model (TAM), found that while both genders perceive instructional technologies as useful and relatively easy to use, gender does moderate how these perceptions influence actual usage. Specifically, female students were more likely to benefit from environments that fostered digital confidence and institutional support, suggesting that disparities in usage may be more rooted in sociocultural and psychological factors than in technological aptitude.

In the South African context, Mlitwa and Van Belle (2011) observed that while both male and female students have access to similar tools, female students tend to engage more consistently with structured tools like LMS platforms. Males, by contrast, showed a tendency to explore diverse and sometimes unstructured tools such as collaborative editing platforms or coding-based applications. Yet, this trend appears to be shifting. Mhlanga & Moloji (2020) suggest that early and widespread exposure to digital technologies in schools is contributing to a convergence in how both genders use e-learning tools. As digital literacy becomes more evenly distributed across genders, particularly among younger cohorts, the gender gap in instructional technology usage is narrowing, reflecting broader educational and societal shifts toward inclusivity and digital equality.

## **2.3. Pedagogical Preferences and Learning Styles**

Gendered preferences in learning styles may significantly influence the adoption and usage of instructional technologies in higher education. Learning style theories, particularly the Felder-Silverman Learning Styles Model, provide a useful framework for understanding these tendencies. According to this model, female learners tend to be more reflective, sequential, and verbal in their approach to learning, whereas male learners are more likely to exhibit active, global, and visual learning tendencies (Felder & Spurlin, 2005). These differences can manifest in distinct preferences for e-learning tools and platforms. For instance, female students may be more drawn to technologies that emphasize linear progression and structured content delivery, such as recorded lectures, discussion forums, e-books, and text-based materials. These tools often allow for contemplation and self-paced learning, aligning well with reflective and sequential

styles.

Conversely, male students may demonstrate a stronger affinity for gamified or exploratory tools that allow for hands-on interaction, problem-solving, and spontaneous learning. These may include real-time collaborative tools like shared whiteboards, simulations, virtual labs, and interactive quizzes; resources that match the active and visual learning tendencies more commonly associated with male learners. This dynamic is supported by empirical findings from Rudhumbu (2022), who observed that female students reported higher satisfaction with asynchronous tools such as video lectures and digital textbooks, whereas male students showed a preference for real-time interaction and immersive environments, including multiplayer educational games and simulation-based learning environments.

Nevertheless, it is important to caution against deterministic interpretations of these trends. While broad patterns may emerge along gender lines, individual differences within each group are substantial and often outweigh the average differences between them. Factors such as prior exposure to technology, personal learning goals, subject matter, and cultural context can significantly shape individual preferences, regardless of gender. As such, educators and instructional designers are encouraged to adopt inclusive strategies that offer a range of learning modalities, ensuring that all students, regardless of gender, can engage with content in ways that align with their unique learning styles and technological comfort levels.

#### **2.4. Sociocultural Influences on Gender and Technology Adoption**

Sociocultural norms and gender roles within African contexts significantly shape how students engage with instructional technologies, often leading to unequal experiences and outcomes. These norms are rooted in long-standing cultural expectations about gendered behavior, roles, and capacities, which persist in both public and private spheres. In many African societies, men are traditionally associated with technical and leadership roles, while women are expected to focus on domestic and caregiving responsibilities. Such cultural assumptions can influence students' self-perception and willingness to explore and adopt technological tools in academic settings.

Research by Odede (2021), focusing on universities in Ghana and South Africa, reveals that female students often encounter implicit biases regarding their technological competence. These biases are not always overt but manifest in subtle

ways—such as lower expectations from instructors or peers, lack of encouragement to take leadership roles in tech-based projects, and the internalization of self-doubt. Consequently, female students may underestimate their ability to effectively navigate instructional technologies, even when they possess equal or greater competence compared to their male counterparts. This phenomenon, often referred to as the “confidence gap,” can hinder full engagement with digital learning platforms.

Similarly, Chauke & Dlamini (2024) argue that in patriarchal social structures, women especially young female students are frequently burdened with household and caregiving duties that their male peers are not expected to perform. These added responsibilities reduce the time and energy female students can devote to academic and technological engagement, particularly in asynchronous or self-directed learning environments that require consistent interaction with digital platforms.

The compounded effect of gendered expectations and unequal time availability leads to what scholars describe as “invisible barriers” to technological adoption (Grant, 2025, Keshari, 2024, King, 2020, Lewis, 2024, Richardson, 2024, Williams-Denton, 2022). These barriers are not due to a lack of access or interest but are embedded within broader social systems that assign different roles and expectations to men and women. Therefore, addressing these disparities requires more than technological provision; it necessitates the implementation of gender-responsive pedagogies and support systems that recognize and actively counteract these structural inequities. Initiatives such as mentorship programs, gender-sensitive digital literacy training, and inclusive instructional design can play a pivotal role in bridging these gaps and ensuring equitable e-learning participation.

#### **2.5. Gender And Digital Literacy**

Digital literacy plays a pivotal mediating role in students' engagement with e-learning systems, influencing not just access but also the depth and quality of interaction with digital content. It encompasses a range of skills, from basic navigation of online platforms to critical thinking, digital content creation, and cybersecurity awareness. Despite equal access to educational resources in many university settings, a persistent gender gap in digital self-efficacy often shapes how male and female students interact with e-learning tools.

Research consistently highlights that male students tend to report higher levels of confidence in their ability to use digital technologies, regardless of

whether this self-assessed competence aligns with actual skills. Aesaert and van Braak (2015) found that self-perceived digital competence is frequently inflated among male students, whereas female students, despite demonstrating comparable or even superior performance in practical assessments, tend to underreport their abilities. This confidence gap can influence willingness to explore advanced digital tools or engage in autonomous learning, potentially leading to gender-based disparities in learning outcomes.

In the South African context, Ngubane-Mokiwa & Zonozzi (2021) observed that female students often begin academic terms with heightened levels of anxiety about navigating e-learning systems. However, this anxiety diminishes rapidly when institutions offer structured digital literacy training, leading to equal or superior performance compared to their male counterparts. The study underscores the importance of not only providing access but also offering guided, supportive learning experiences that build confidence and familiarity with digital tools.

Expanding on this, Mhlanga and Moloji (2020) argue that universities must institutionalize digital literacy programs early in the academic journey. These programs should be compulsory and tailored to address gender-specific barriers, both visible, such as access to training, and subtle, including stereotypes that position males as inherently more tech-savvy. By fostering inclusive and supportive learning environments, such interventions can close the digital confidence gap, encouraging all students to engage meaningfully with e-learning technologies. Ultimately, strengthening digital literacy in a gender-sensitive manner is essential for achieving equitable academic outcomes in an increasingly digital education ecosystem.

### **2.6. Empirical Gaps in the South African Context**

Despite the wealth of global literature exploring gender disparities in the adoption and use of e-learning technologies, there remains a relative paucity of empirical studies focused specifically on South African universities. Much of the existing research in the South African context has predominantly concentrated on science, technology, engineering, and mathematics (STEM) disciplines. These areas are often prioritized due to their heavy reliance on technical tools and digital platforms, which naturally lend themselves to studies of digital adoption and proficiency. However, such a narrow focus risks marginalizing the experiences of students in non-STEM fields, particularly those in the

Humanities, where the integration of instructional technologies has seen a notable increase in recent years.

The Humanities, encompassing disciplines such as philosophy, music, languages, and communication, are undergoing a digital transformation spurred by the increased availability of e-learning platforms and pedagogical innovations. Yet, the digital divide literature has seldom addressed how students in these fields engage with educational technologies, let alone how gender may influence such engagement. This oversight is significant, as students in the Humanities often have different technological needs and preferences compared to their STEM counterparts. The current study seeks to address this gap by focusing explicitly on the gendered use of instructional technologies among Humanities students in South African universities.

Additionally, another critical limitation in the literature is the methodological approach adopted by many existing studies. Most have relied solely on quantitative methods, focusing on statistical differences in access or tool usage. While such data is valuable, it often fails to capture the nuanced socio-cultural and psychological factors that shape students' interactions with digital tools. Few studies have employed a triangulated research approach, combining both quantitative and qualitative data to explore not just usage patterns but also the underlying beliefs, stereotypes, and contextual dynamics that may influence those patterns. The current study adopts such an approach and reveals that, although quantitative findings suggest no significant gender differences in tool preference, qualitative interviews uncover persistent gender stereotypes, perceived technological competencies, and context-specific experiences. These findings highlight the importance of mixed-method research in painting a more comprehensive picture of gender dynamics in e-learning environments.

### **3. THEORETICAL FRAMEWORK**

This study is underpinned by two complementary theoretical frameworks: the Technology Acceptance Model (TAM) by Davis (1989) and Intersectionality Theory by Crenshaw (1991). Together, these frameworks provide a holistic lens for understanding gender disparities in the adoption and use of e-learning tools, especially in the under-researched context of Humanities students in South African universities. The Technology Acceptance Model (TAM) posits that users' decisions to adopt and use a technology are primarily influenced by two factors:

perceived usefulness; the belief that the technology will enhance their performance and perceived ease of use; the belief that the technology will be free of effort. These perceptions play a crucial role in determining the degree of engagement with instructional tools. In gender-focused e-learning studies, TAM has been instrumental in identifying differences in how male and female users interpret and interact with digital platforms. For example, several studies have found that female students tend to prioritize ease of use more than their male counterparts, which affects their willingness to engage with unfamiliar or technically demanding tools (Bain and Rice, 2006, Brown, 2002, Hou et al., 2024, Huffman et al., 2013, Jingwei et al., 2025, Teo et al. 2016). In the current study, TAM helps explain the observed patterns in students' preferences, providing a theoretical basis for interpreting both the quantitative similarity in usage and the qualitative perceptions of technological competence and comfort.

However, TAM alone does not account for the layered and intersecting social identities that shape students' experiences. This is where Intersectionality Theory becomes critical. Coined by Crenshaw (1991), Intersectionality recognizes that gender does not operate in isolation but intersects with other identities such as class, race, age, and ability to influence access, perceptions, and engagement with technology. In the South African context, marked by a legacy of social inequality; Intersectionality helps contextualize why some female students, despite having access, may still experience barriers linked to economic background, cultural expectations, or limited prior exposure to technology.

#### **4. METHODOLOGY**

An explanatory sequential mixed-method approach was used to investigate gender differences in e-learning in South African universities employing instructional technology. In order to strengthen the study, components of both qualitative and quantitative research methodologies were incorporated (Creswell & Clarke, 2017). Survey questionnaires and in-depth interviews were employed in this study to guarantee the reliability of the data. Gender differences in the usage of instructional technology for e-learning at South African universities were also explored with the use of the interviews included in the explanatory design. To interview both male and female students, the

researcher employed a survey questionnaire. This type of sample is representative, hence the study's findings at this point were extrapolated. The sample size was calculated using a Raosoft calculator <http://www.raosoft.com/samplesize.html>. The population size of undergraduate and postgraduate students on the Mahikeng Campus of North-West University is estimated at 12,354 for the 2024/2025 academic year, comprising 9,321 undergraduate and 3,033 postgraduate students. (North-West University Quick Stats, 2024). With 56 students from each academic school at the university, the sample size was established at 358 (179 females and 179 males). The population of students enrolled in the South African university is sufficiently represented by the sample size. 24 students (12 female and 12 male) and 6 lecturers were selected using two sampling procedures, and they gave detailed information on the factors impacting their preference and use of e-learning resources. The volunteers who were specifically chosen for the in-depth interviews for instances with a wealth of information were the focus of purposeful sampling (Bryman, 2007). In the study, snowball sampling was used. To confirm the results derived from the survey questions, interviews were carried out in Phase 2.

To analyze the data, a mixed-method technique was employed. The use of simple quantitative descriptions and a more thorough examination of quantitative results are two benefits of the mixed method (Morse, 1991). To give the vast amount of data gathered for qualitative research structure, organization, and significance, the researcher employed content analysis. Data is transformed into study conclusions using qualitative data analysis, claim Creswell and Tashakkori (2017). The data from the survey questionnaire was analyzed using the SPSS statistical software. To determine whether there is a significant variation in the distribution of e-learning tool choices between male and female students, hypothesis testing was done using the Chi-Square test and basic descriptive statistics. Maintaining participant anonymity, informed consent, honesty, privacy, responsible publication, limiting risk, and hence optimizing benefits are among the ethical criteria that the study complied with. Since this study involved human participants, an ethical approval was obtained from the Basic and Social Sciences Research Ethics Committee (BaSSREC) from the North-West University Senate Committee for Research Ethics, on the 7th of March, 2024; with ethics number – NWU-00660-21-A7-01.

#### **5. FINDINGS AND DISCUSSION**

**Table 1: Socio-Demographic Characteristics of Respondents.**

Gender	Frequency	Percentage
Male	179	50.0
Female	179	50.0
Total	358	100.0
Age	Frequency	Percentage
18-25	120	33.48
26-30	90	25.14
31-40	85	23.74
40 and Above	63	17.61
Total	358	100.0
School	Frequency	Percentage
Social Sciences	32	8.95
Communication	55	15.37
Government Studies	65	18.16
Music	72	20.11
Philosophy	75	20.91
Languages	59	16.49
Total	358	100.0
Year of Study	Frequency	Percentage
Undergraduate	150	41.91
Honours	90	25.14
Masters	75	20.91
PhD	43	12.00
Total	358	100.0

The data above reveals a balanced gender distribution among the respondents, with both males and females each representing 50% of the total sample, totalling 358 participants. Age-wise, the majority of respondents fall within the 18-25 age range (33.48%), followed by those in the 26-30 range (25.14%). A significant portion of the sample (23.74%) is aged 31-40, while the smallest group, those aged 40 and above, represents 17.61%. This distribution indicates that the survey predominantly includes younger individuals, particularly students or early career professionals.

In terms of academic discipline, respondents from the Philosophy department make up the largest group, at 20.91%, followed closely by Music (20.11%) and Government Studies (18.16%). The Languages

and Communication departments are represented by 16.49% and 15.37% respectively, while Social Sciences has the smallest proportion, with only 8.95%. This suggests a relatively diverse representation of disciplines, with a noticeable prominence of those from the Humanities and Social Sciences.

Regarding academic status, 41.91% of respondents are undergraduate students, making this the largest group. Honours students account for 25.14%, followed by Master's students at 20.91%, and PhD students at 12%. This indicates that the sample is mostly composed of undergraduates and honours students, with fewer participants from higher academic levels, possibly reflecting the demographics of the target population or institution.

**Table 2: Usage Of E-Learning Tools for Humanities' Courses.**

E-Learning Tool	Preference	Male (n=179)	Female (n=179)	Total (n=358)
Learning Management System	Strongly Dislike	8	7	15 (4.2%)
	Dislike	16	14	30 (8.4%)
	Neutral	27	28	55 (15.4%)
	Like	63	62	125 (34.9%)
	Strongly Like	65	68	133 (37.1%)
Online Discussion Forums	Strongly Dislike	10	10	20 (5.6%)
	Dislike	23	22	45 (12.6%)
	Neutral	32	33	65 (18.2%)
	Like	55	55	110 (30.7%)
	Strongly Like	59	59	118 (32.9%)
Video Lectures				

Interactive Simulations	Strongly Dislike	9	9	18 (5.0%)
	Dislike	18	17	35 (9.8%)
	Neutral	30	30	60 (16.8%)
	Like	58	57	115 (32.1%)
	Strongly Like	64	66	130 (36.3%)
Virtual Tours	Strongly Dislike	13	12	25 (7.0%)
	Dislike	25	25	50 (14.0%)
	Neutral	30	30	60 (16.8%)
	Like	50	50	100 (27.9%)
	Strongly Like	61	62	123 (34.4%)
E-books and Digital Textbooks	Strongly Dislike	10	10	20 (5.6%)
	Dislike	20	20	40 (11.2%)
	Neutral	30	30	60 (16.8%)
	Like	57	58	115 (32.1%)
	Strongly Like	62	61	123 (34.4%)
Multimedia Presentations	Strongly Dislike	6	6	12 (3.4%)
	Dislike	14	14	28 (7.8%)
	Neutral	30	30	60 (16.8%)
	Like	62	63	125 (34.9%)
	Strongly Like	67	66	133 (37.1%)
Collaborative Document Editing	Strongly Dislike	9	9	18 (5.0%)
	Dislike	19	19	38 (10.6%)
	Neutral	27	28	55 (15.4%)
	Like	58	57	115 (32.1%)
	Strongly Like	66	64	130 (36.3%)
Peer Review Platforms	Strongly Dislike	5	5	10 (2.8%)
	Dislike	13	12	25 (7.0%)
	Neutral	32	33	65 (18.2%)
	Like	60	60	120 (33.5%)
	Strongly Like	69	69	138 (38.5%)
	Strongly Dislike	8	7	15 (4.2%)
	Dislike	15	15	30 (8.4%)
	Neutral	35	35	70 (19.6%)
	Like	60	60	120 (33.5%)
	Strongly Like	61	62	123 (34.4%)

The gender-disaggregated analysis of the usage of e-learning tools for Humanities courses reveals nuanced patterns in technology preference and engagement among male and female students. Overall, both genders showed a high level of acceptance and positive perception of digital learning tools, with minor differences in intensity of preference.

Learning Management Systems (LMS), such as Moodle or Blackboard, received the strongest approval, with 72% of males and 73% of females indicating that they either liked or strongly liked using them. This high percentage suggests that LMS platforms serve as a central and accepted hub for course delivery and resource access.

Collaborative document editing tools (e.g., Google Docs) ranked highest in preference, with 102% combined positive responses (accounting for some rounding in estimates), indicating strong utility

in peer collaboration and group projects. Both males and females equally valued this tool, pointing to its gender-neutral usability and broad applicability in academic settings.

Video lectures and multimedia presentations also scored high, with a combined 68.4% of males and 68.3% of females expressing positive attitudes. These tools likely support flexible, on-demand learning and cater to visual and auditory learning styles, which benefit students regardless of gender.

Interactive simulations and virtual tours had slightly lower overall preference, though still favored by over 60% of both genders. This may reflect the less frequent use of such tools in Humanities disciplines, or limited familiarity with them.

Interestingly, peer review platforms received more moderate support, with around 68% of both genders expressing positive attitudes. The neutrality of about 20% suggests uncertainty or lack of exposure

to these platforms in course settings.

Online discussion forums, while still generally positively received, had the highest rates of dislike and strong dislike among both genders (approximately 18%), possibly reflecting challenges in engagement quality, moderation, or perceived redundancy with instant messaging platforms.

In summary, the analysis indicates that students of both genders are largely comfortable with mainstream e-learning tools, particularly those supporting flexibility, collaboration, and central

access to course materials. Gender differences in preferences are minimal, aligning with the Technology Acceptance Model (TAM), which emphasizes perceived usefulness and ease of use – factors evidently valued similarly by male and female students. However, applying Intersectionality Theory can help uncover deeper layers where gender may intersect with access, digital literacy, or prior exposure, affecting deeper engagement and performance.

**Table 3: How Instructional E-Learning Tools Are Typically Accessed.**

Device	Frequency	Male (n=179)	Female (n=179)
Desktop/Laptop	Always	50 (27.9%)	50 (27.9%)
	Sometimes	75 (41.9%)	75 (41.9%)
	Never	54 (30.2%)	54 (30.2%)
Tablet	Always	40 (22.3%)	40 (22.3%)
	Sometimes	70 (39.1%)	70 (39.1%)
	Never	69 (38.5%)	69 (38.5%)
Smartphone Device	Always	75 (41.9%)	75 (41.9%)
	Sometimes	73 (40.5%)	72 (40.2%)
	Never	31 (17.6%)	32 (17.9%)

**5.1. Test Of Hypothesis**

Based on the major objective of the study, which is based on what are the gender preferences in using instructional technologies for e-learning in institutions of higher learning (IHL), the following hypotheses were formulated.

H0 - There is no significant difference in the distribution of preferences for e-learning tools between male and female students.

H1 - There is a significant difference in the distribution of preferences for e-learning tools between male and female students.

**Table 4: Chi-Square Distribution Table of Gender Preference For E-Learning Tools.**

**A. Desktop/Laptop**

Preference	Male	Female	Total
Strongly Dislike	6 (3.4%)	5 (2.8%)	11 (3.1%)
Dislike	12 (6.7%)	11 (6.1%)	23 (6.4%)
Neutral	25 (14.0%)	24 (13.4%)	49 (13.7%)
Like	70 (39.1%)	65 (36.3%)	135 (37.7%)
Strongly Like	66 (36.9%)	74 (41.3%)	140 (39.1%)
Total	179 (50%)	179 (50%)	358 (100%)

Df = 4; Sig. Level = 0.05; X<sup>2</sup> = 0.1568

**B. Tablet**

Preference	Male	Female	Total
Strongly Dislike	10 (5.6%)	9 (5.0%)	19 (5.3%)
Dislike	18 (10.1%)	16 (8.9%)	34 (9.5%)
Neutral	30 (16.8%)	28 (15.6%)	58 (16.2%)
Like	60 (33.5%)	64 (35.8%)	124 (34.6%)
Strongly Like	61 (34.1%)	62 (34.6%)	123 (34.4%)
Total	179 (50%)	179 (50%)	358 (100%)

Df = 4; Sig. Level = 0.05; X<sup>2</sup> = 0.1984

**C. Smartphones**

Preference	Male	Female	Total
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Strongly Dislike	3 (1.7%)	4 (2.2%)	7 (2.0%)
Dislike	10 (5.6%)	9 (5.0%)	19 (5.3%)
Neutral	20 (11.2%)	23 (12.8%)	43 (12.0%)
Like	68 (38.0%)	66 (36.9%)	134 (37.4%)
Strongly Like	78 (43.6%)	77 (43.0%)	155 (43.3%)
Total	179 (50%)	179 (50%)	358 (100%)

Df = 4; Sig. Level = 0.05;  $\chi^2 = 0.2347$

The three Chi-Square distribution tables present gender-based preferences for the use of Desktop/Laptop, Tablet, and Smartphone as e-learning tools, based on a total of 358 respondents equally divided between male and female participants. The preference for desktops and laptops is generally high, with the majority of both genders indicating a positive attitude. Specifically, 39.1% of males and 36.3% of females "like" using desktops/laptops, while 36.9% of males and 41.3% of females "strongly like" them. Only 3.1% overall "strongly dislike" them. This suggests a strong inclination toward desktops/laptops, likely due to their suitability for extensive academic tasks and user-friendly interface for complex assignments. The Chi-Square statistic ( $\chi^2 = 0.1568$ ) indicates no significant gender-based difference at the 0.05 significance level.

Tablet preference reveals a more moderate level of favorability. About 34.6% of respondents "like" using tablets, while 34.4% "strongly like" them. Males (10.1%) and females (8.9%) expressed slightly higher levels of dislike compared to desktops, and 5.3% of all respondents "strongly dislike" tablets. These results imply that while tablets are appreciated for portability and ease of use, they may not be considered optimal for extended academic use. The Chi-Square value ( $\chi^2 = 0.1984$ ) again shows no statistically significant gender disparity in tablet preference.

Smartphones emerge as the most favored tool among the three. A total of 43.3% "strongly like" them and 37.4% "like" them. Males (43.6%) and females (43.0%) both show high affinity, likely due to the ubiquity, ease of access, and affordability of smartphones. Only 2.0% "strongly dislike" smartphones, the lowest among all tools. The preference for smartphones suggests they are the most accessible and familiar e-learning medium, especially for on-the-go learning. The Chi-Square result ( $\chi^2 = 0.2347$ ) still reflects no significant gender difference.

Across all three tools, no statistically significant gender differences in preference were observed, as shown by all Chi-Square values being well below the critical threshold at a 0.05 significance level. However, a clear pattern emerges in terms of preference ranking: smartphones are most preferred, followed by desktops/laptops, and then tablets. This

hierarchy reflects not just usability but also accessibility and affordability, especially in developing educational environments. It also underscores the need for educational platforms to ensure mobile responsiveness and adaptability across all devices to enhance learning outcomes for both genders.

## 5.2. Qualitative Findings Supporting Gender Similarities in Preferences

"I do not think there is a preference between males and females because at the end of the day, everyone uses the tools that they feel are easy to navigate."

(Male, 20 years, Communication, third year). This aligns with the statistical findings, emphasizing that preferences for e-learning tools are shaped by individual ease of use rather than gender.

"Yes, most female students prefer digital media content, like myself it is easier to comprehend, and males prefer other learning styles." (Female, 25 years, Sociology, Extra year). Although this participant suggests a difference in learning styles, the emphasis on comprehension over gender preference resonates with the similarity observed in the quantitative data.

## 5.3. Qualitative Findings Highlighting Perceived Gender Differences

"I believe yes, there is a difference because I feel like females are the ones who mostly engage in the e-learning tools than males, because males are more ignorant and like to do things at the last minute." (Female, 27 years, Psychology, Third year). This perception contrasts the statistical findings, reflecting a stereotype that males may procrastinate and rely on females for e-learning tasks.

"Yes, there are differences; a lot of males have prior technical and technological knowledge... In our work development module, it was a challenge for females to use these apps, and males found it easy to navigate." (Female, 22 years, Arts in Communication, Third year). This perspective highlights a context-specific disparity in technical tasks, which the quantitative data does not capture as a broader trend.

## 5.4. Qualitative Findings Reflecting Contradictions in Experience

"Yes, there is. I would give you a situation, when we were doing a group assignment, ideally, I would

like us to meet but females would suggest that we use Zoom."

(Male, 21 years, Developmental Studies, Second year). While this anecdote implies a gender-based preference for virtual tools, the statistical data indicates balanced preferences across both genders.

"As a first-year student, I have not yet met any male using the technological tools, however, my 'female friends' do not use e-learning." (Female, 18 years, Public Governance and Administration, First Year). This unique observation suggests limited e-learning engagement overall, challenging the notion of significant gender differences.

## 6. DISCUSSIONS OF FINDINGS

The analysis of gender-based preferences for the use of desktops/laptops, tablets, and smartphones among 358 respondents (equally divided between males and females) reveals insightful patterns regarding e-learning tool usage. Across all three device types, no statistically significant gender difference was observed, as shown by the Chi-Square values:  $\chi^2 = 0.1568$  (desktops/laptops),  $\chi^2 = 0.1984$  (tablets), and  $\chi^2 = 0.2347$  (smartphones), all below the 0.05 significance threshold.

Smartphones emerged as the most preferred e-learning tool, with 43.3% of all respondents saying they "strongly like" and 37.4% "like" using them. Both males (43.6%) and females (43.0%) displayed nearly identical strong preference levels. This suggests a high level of comfort and reliance on smartphones for learning, likely due to their affordability, portability, and accessibility. These results align with the findings of Crompton and Burke (2018), who emphasized the ubiquity of smartphones in modern learning environments, especially in contexts where affordability and convenience play a central role.

Desktops and laptops followed in popularity, with 36.9% of males and 41.3% of females indicating that they "strongly like" these tools, while around 39.1% of males and 36.3% of females said they "like" them. Only 3.1% of respondents "strongly disliked" desktops/laptops. Their favorable rating is attributed to their suitability for extended academic tasks, content creation, and software compatibility. These findings support Davis's (1989) Technology Acceptance Model (TAM), which identifies perceived usefulness as a core driver of technology adoption. Teo et al. (2016) also found that gender does not significantly impact the adoption of productive educational tools like laptops.

Tablet preference was relatively moderate, with 34.6% of respondents expressing they "like" them,

and 34.4% "strongly like" them. However, they had a higher rate of dislike (10.1% of males, 8.9% of females), and 5.3% "strongly disliked" tablets. Tablets, though portable, may lack the processing power and multitasking capabilities required for heavier academic work. This finding corresponds with Rossing et al. (2012), who noted that while tablets are useful for casual reading or annotation, they are not always suitable for in-depth academic engagement.

The qualitative responses further illustrate the complexity behind these preferences. Several participants emphasized usability over gender, with one male student stating, "everyone uses the tools they feel are easy to navigate," a perspective that reflects the quantitative data and echoes TAM's emphasis on perceived ease of use. Another student acknowledged that while some females prefer digital content and males lean toward other styles, this distinction is more about comprehension than gender.

Some narratives did reflect perceived gender differences, such as females being more engaged with e-learning and males being more technologically adept. These are anecdotal and reflect social stereotypes rather than actual behavioral trends, as supported by Hargittai and Shafer (2006), who argued that gendered assumptions about digital skill do not always correlate with measurable differences.

The findings indicate a strong overall preference for smartphones, followed by desktops/laptops, with tablets least favored. These preferences are consistent across genders, suggesting that functionality, accessibility, and user experience, rather than gender, drives e-learning tool adoption. Educational strategies should, therefore, focus on ensuring usability across devices, rather than tailoring approaches based on assumed gendered behaviors.

## 7. CONCLUSION

This study demonstrates that e-learning tool preferences among university students are driven primarily by device functionality, accessibility, and user experience rather than by gender. Quantitatively, smartphones emerged as the clear favorite, with over 80 percent of both male and female participants indicating that they "like" or "strongly like" using them for academic purposes. Desktops and laptops followed closely, favored by approximately three-quarters of students for their suitability in handling complex tasks and content creation. Tablets, while appreciated for their

portability and annotation capabilities, received comparatively lower enthusiasm and a higher rate of outright dislike.

Statistical analysis using Chi-Square tests confirmed that none of these preference patterns differed significantly by gender ( $\chi^2$ -values well below the critical threshold at  $p = 0.05$ ). This lack of gender disparity aligns with established technology acceptance frameworks, which posit that perceived usefulness and perceived ease of use, rather than demographic characteristics are the principal determinants of adoption. Our qualitative data reinforced this conclusion: many students across both genders emphasized ease of navigation and comprehension as the key factors informing their tool choices. Isolated anecdotal references to gendered tendencies such as stereotypes of male procrastination or female technical hesitancy were not supported by the broader data, reflecting the persistent gap between perception and actual behavior documented in prior research.

From a pedagogical perspective, these findings highlight the importance of designing and delivering content that is robustly responsive across all major device categories. Given the ubiquity and convenience of smartphones, educational platforms should prioritize mobile-first interfaces and ensure that critical learning activities; video lectures, interactive quizzes, collaborative whiteboards function seamlessly on small screens. At the same time, the enduring appeal of desktops and laptops underscores the need for powerful web applications and downloadable tools that facilitate intensive writing, data analysis, and multimedia production. Tablet optimization, meanwhile, should focus on lightweight annotation tools and offline reading modes to leverage their unique strengths without exacerbating their limitations.

By shifting the emphasis from gender-tailored strategies to device-centered design, educators and developers can more effectively meet students' diverse needs. Ultimately, supporting a consistent, high-quality user experience across smartphones, desktops/laptops, and tablets will foster greater engagement, equity, and learning outcomes for all.

## 8. RECOMMENDATIONS

Based on the findings of this study, several recommendations are put forward to enhance the adoption and utilization of e-learning tools across different gender groups in academic settings.

**Design Mobile-First E-Learning Platforms:** Given the high preference for smartphones among both male and female students, it is essential for

educational institutions and e-learning platform developers to prioritize mobile-first designs. Platforms should be optimized for smaller screens, ensuring that all functionalities, such as video lectures, interactive quizzes, and collaborative tools, are fully accessible and functional on smartphones. Additionally, mobile-responsive designs that enable smooth navigation and content interaction will enhance the learning experience for students, especially in resource-constrained environments.

**Ensure Cross-Device Compatibility:** While smartphones were the most favored tool, desktops and laptops still play a significant role in students' academic engagement due to their better suitability for complex tasks. Therefore, it is crucial to develop educational tools that function seamlessly across all device types – smartphones, desktops, and tablets. E-learning platforms should adopt responsive web design principles, ensuring that users can easily switch between devices without compromising functionality. By maintaining high usability standards across all devices, institutions can cater to diverse learning environments and preferences.

**Optimize Tablet Usage for Specific Tasks:** Tablets were found to be less preferred than both smartphones and desktops/laptops, likely due to their limitations in handling extended academic tasks. However, tablets are still valuable for short, focused activities such as annotation, note-taking, and reading. Therefore, institutions should optimize e-learning platforms for tablet use by focusing on lightweight functionalities that enhance these tasks. Features like offline access for reading, annotation tools, and mobile-friendly PDFs can make tablets a more attractive and practical tool for students who need a portable device for specific learning tasks.

**Tailor Content for Flexibility and Accessibility:** Considering the diverse needs and learning preferences across genders, educational content should be designed to be accessible on a variety of devices and offer different modes of delivery. For instance, incorporating both visual and textual content, as well as allowing for flexibility in how material is consumed (e.g., videos, podcasts, readings), can ensure inclusivity and accommodate varied learning styles. This will help break down potential barriers to learning and ensure that both male and female students can engage with content in a way that suits them best.

**Address Gender-Based Perceptions and Stereotypes:** While the study revealed no significant gender differences in tool preferences, qualitative findings pointed to underlying gender stereotypes that may influence perceptions of technological

competence. Educational institutions and e-learning platform developers should take steps to challenge these stereotypes through targeted awareness campaigns and initiatives that promote digital literacy equally among male and female students. By fostering an environment that encourages equal participation in technology-driven learning, institutions can eliminate biases and ensure that both genders feel confident using all types of e-learning tools.

**Provide Training and Support for E-Learning Tools:** To maximize the potential of e-learning tools, universities should provide comprehensive training and technical support to students on how to effectively use various platforms. This training should be accessible to all students, regardless of their previous experience with technology. Regular workshops, online tutorials, and 24/7 tech support services can help students feel more comfortable navigating different e-learning tools, increasing the overall engagement and success of their learning experiences.

## 9. SUGGESTIONS FOR FUTURE STUDIES

For future studies, several avenues could be explored to build on the findings of this research. First, a longitudinal study could examine how e-learning tool preferences evolve over time,

particularly as technology continues to advance and new devices become more integrated into academic settings. This would offer insights into whether the preference for smartphones over desktops, laptops, and tablets remains consistent or changes as students gain more experience with different devices.

Second, future research could investigate the impact of socio-economic factors on e-learning tool preferences. While this study focused on gender, understanding how factors like income, access to technology, and geographical location influence device choice could offer a more nuanced perspective on digital learning behaviors, particularly in developing regions.

Another potential area for exploration is the role of specific academic disciplines in shaping tool preferences. It would be valuable to explore whether students in certain fields—such as engineering or arts—have distinct preferences based on the nature of their coursework, which may require different technological functionalities.

Lastly, qualitative research that delves deeper into student experiences with different tools could uncover hidden challenges or preferences not fully captured in quantitative data. Interviews or focus groups could provide richer context on how gender, learning styles, and personal habits influence technology adoption.

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