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Digital Literacy of Language Learning in Higher Education: The Gender Perspective

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Abstract: This study investigated the perceptions and utilisation of digital literacy among university students in language-learning settings in Medan, Indonesia, specifically examining gender-based differences. Employing a qualitative descriptive approach within a social constructivist paradigm, the research collected data from 120 university students (56 male, 64 female) through open-ended essay questionnaires. Findings revealed significant gender-based distinctions in digital tool usage, confidence levels, and perceived roles within language learning contexts. Female students frequently demonstrated a preference for creative platforms and expressed hesitation, often attributed to a fear of making errors when exploring new tools. This contrasted with male students' inclination towards functional tools and their emphasis on technical limitations. Observations in classroom settings revealed an implicit reinforcement of traditional gender roles, with male students typically assigned to manage technical tasks, while female students focused on writing and design. This study addresses a critical gap in existing literature by offering a granular qualitative exploration of gender performativity in digital literacy among Indonesian university students, thereby enriching global discussions that are predominantly shaped by Western contexts and quantitative studies. The practical implications of these findings are substantial for developing gender-sensitive pedagogies and curricula in higher education. Specific interventions recommended include targeted digital skill workshops for female students, promoting diverse role assignments in group projects, and integrating self-efficacy-building exercises for all learners. These measures aim to cultivate more equitable and inclusive digital learning environments, empowering all students to achieve their full potential and thrive in the evolving digital age, irrespective of gender.

Keywords: digital literacy, gender performativity, higher education, inclusive learning environments, language-learning settings, pedagogical interventions, student perceptions.

Introduction

The modern digital era has a profound impact on individuals, demanding a high degree of digital literacy for active engagement in learning activities, workplace tasks, and civic responsibilities, particularly among university students. The pervasive presence of digital information and social media has transformed conventional literacy to include competencies to find, process, analyse, and ethically engage with digital information (Laretive, 2019). This shift necessitates the reprioritisation of higher education systems to prepare students with the requisite competencies to thrive in online and multimodal environments. Digital literacy, as noted by Tan (2024), has emerged as a significant theme in interdisciplinary academic literature, encompassing information science, computer science, and education, due to its indispensable importance in preparing learners to address contemporary social and professional challenges. Universities play a crucial role in developing digital skills among their students, yet various inequalities persist, primarily along gender lines.

The current academic literature (2021-2025) provides robust investigations into the intricate connections between digital literacy and gender-related factors. Research by David and Phillips



(2022) highlights that gender differences in digital access extend beyond mere availability, necessitating a comprehensive systems analysis. GEM Report UNESCO (2023) further discusses the barriers to and facilitators of promoting equity in educational technology, emphasizing that advancing gender equality must be a deliberate design principle in EdTech initiatives. Shah and Krishnan (2023) conduct a dynamic panel analysis of the digital gender gap, linking it to institutional independence at the country level and arguing that digital inclusion is deeply rooted in broader societal structures. Long, Hoang, and Simkins (2023) specifically evaluate variations in digital literacy between genders across generations in Indonesia, underscoring how local conditions diverge from global standards.

Furthermore, Okello (2024) analyses digital divide obstacles in Kenya, illustrating how economic and cultural situations significantly shape digital literacy outcomes. The collective findings from these recent studies indicate that, despite a global enhancement in digital access, significant inequalities in digital literacy, confidence, and usage persist, frequently along gender dimensions and profoundly shaped by varying national contexts. For instance, while developed countries often prioritise the 'second-order' digital divide concerning high-level competencies and practical usage, developing nations frequently grapple with fundamental issues of basic access and digital confidence, with the latter disproportionately impacting women (van Deursen & van Dijk, 2019; World Bank, 2023).

Ng (2012) developed a comprehensive digital literacy model comprising cognitive, technical, and socio-emotional aspects. This model suggests that, despite increased parity in technological access, male students often report higher confidence and perceived competence in digital tasks. In contrast, female students tend to report lower self-efficacy when engaging in similar usage behaviours (Samani et al., 2019). These observed differences reflect broader societal patterns that influence individual perceptions and actions across various contexts. Butler's (1990) theory of gender performativity offers a compelling explanation for these trends, asserting that behaviours linked to digital competence are products of social construction and are maintained through continuous societal reinforcement. Consequently, digital literacy serves not only educational purposes but also functions as a measure of social inequality, thereby solidifying its critical importance in modern educational environments. The significance of these inequalities is further underscored by the second-order digital divide model, which emphasises the qualitative dimensions and consequences of digital usage beyond mere access (van Dijk, 2006). Despite controlling for variables such as income and education, women often remain underrepresented in online activities geared toward educational or economic advancement (David & Phillips, 2022). This situation is particularly pertinent in language learning, where online spaces offer interactive, multimodal opportunities; yet, gendered disparities in confidence and participation can significantly limit potential.

Wallis (2019) and Grizzle and Wilson (2011) compellingly argue that digital literacy education must be precisely tailored to the specific institutional, social, and cultural contexts of learners,



thereby challenging a universalised approach. This necessitates an understanding of gender not merely as a binary biological construct but also as an experiential and performative dimension that profoundly affects students' interaction with digital technologies and learning spaces. The current approach to gender analysis has evolved beyond basic female-male outcome contrasts towards an in-depth study of how intricate gender identities relate to digital involvement. The continuous performance of gendered behaviours, aligned with Butler's (1990) theoretical framework, elucidates how deeply ingrained societal expectations, rather than inherent differences, primarily determine students' engagement with digital practices. Our research treats digital literacy as a dynamic skill that emerges from the interplay of personal identity, social power dynamics, and environmental contexts. In the specialised field of language learning, computer literacy is indispensable as it unlocks a vast array of resources, facilitates student collaboration, enables self-expression, and supports critical examination of multimedia content. By meticulously considering how gender influences these processes, educators and institutions can design pedagogical practices that are more responsive, inclusive, and move beyond simplistic male and female ability categories towards holistic, identity-responsive educational models.

This research presents its novelty through an original qualitative and performative methodology that specifically examines university language acquisition in Medan, Indonesia. This study examines the complex mechanisms underlying gendered digital literacy through a socio-psychological and performative analysis of non-Western academic environments. This approach contrasts significantly with previous research, which primarily utilised quantitative methods to measure access or general gender disparities (e.g., Long et al., 2023; David & Phillips, 2022). This study achieves novelty by providing detailed, context-specific insights into daily digital language learning gender performance and experiences, thereby enriching and supporting broader global research. It critically examines the dynamic and nuanced gender inequalities in language acquisition and digital literacy within higher education. Despite the widespread use of digital technologies and their increasing integration into curricula, a predominant focus on mere technology accessibility often overlooks the crucial socio-psychological and performance-based factors that significantly influence how male and female students interact within digital settings.

The urgency of this research is profoundly reinforced by the rapid digitalisation of education, particularly in the wake of recent global crises and the growing reliance on online learning modalities. This acceleration has critically heightened the need for robust digital skills across all demographics, as existing gender disparities are poised to exacerbate in these new digital spaces, potentially leading to inequitable educational and professional opportunities. Furthermore, a deeper understanding of how gender influences the nature of digital interaction is crucial. Such understanding enables the design of practical, inclusive, and future-proof educational systems that can cater to diverse learner needs in a constantly evolving technological world. By investigating the complex interrelationships between gender and digital literacy, including aspects such as confidence, tool use preferences, and assigned classroom roles, this study aims to provide



actionable recommendations for crafting more equitable education policies and practices. Ultimately, these findings are instrumental in assisting to close the gender digital divide, ensuring all students, regardless of gender, possess the necessary digital skills for future employment, civic engagement, and social mobility in an increasingly digital global landscape. This research thus contributes towards fostering a more empowered, equitable, and digitally literate society where all individuals can contribute meaningfully.

This study makes a significant contribution to the scientific field by transcending traditional quantitative analyses of digital access or usage rates. Employing a qualitative descriptive methodology grounded in Butler's gender performativity theory and a social constructivist paradigm, this study offers fresh perspectives on the underlying causes and operational dynamics of gendered digital participation within a specific cultural context. The study meticulously examines the gendered perception and practical application of digital literacy practices in language learning. By prioritising lived experience and contextual understanding over a straightforward gender comparison, it examines the cognitive, technical, and affective dimensions of digital engagement among male and female university students in Medan explicitly. The overarching goal is to illuminate the complex relationship between gender identity and digital participation within an Indonesian higher education setting, thereby informing specific pedagogical and institutional strategies that aim to promote more equitable learning outcomes.

Research Questions

1. How do male and female university students perceive their digital literacy in the context of language learning through a gendered lens?
2. Why do institutional practices and teaching approaches contribute to gendered digital literacy experiences among university students in language learning?"

Research Objectives

1. To explore how gender perspectives shape university students' confidence, engagement, and attitudes in digital language learning environments.
2. To examine why institutional practices and teaching approaches contribute to gendered digital literacy experiences in language learning.

Literature Review

Gender Perspective on Digital Literacy

The gender perspective on digital literacy critically examines persistent inequalities in access, participation, and outcomes between male and female learners across diverse socio-economic contexts. Research consistently indicates that women, particularly in low- and middle-income countries, remain less inclined to use or benefit economically from digital technology, despite having similar internet use rates (David & Phillips, 2022; World Bank, 2023). This is exacerbated by



entrenched socio-cultural power dynamics and the complex "wicked" character of digital inequality, in which uncomplicated access and agency are not necessarily followed by empowering or participatory usage (van Deursen & van Dijk, 2019). Comparative gendered digital behaviour studies reveal nuanced differences: female students are often more discerning in their evaluation of information sources than male students, who tend to be more assured in handling digital content (Morgan et al., 2021). This is supported by recent meta-analyses (Harputlu & Gryay, 2024), which reinforce the necessity for capability building in terms of gender-specific needs, rather than merely access. Theoretical accounts, such as Butler's (1990) concept of performativity of gender and Bourdieu's (1986) notion of cultural capital, have been employed to explain how gendered identities are enacted and produced online (Ahmed, 2022). These accounts all argue that digital literacy is not a neutral competence but is embedded within broader social structures that maintain gendered inequalities.

Globally, gender digital gaps manifest in various forms, highlighting significant disparities in both access and quality of digital engagement. For instance, in Scandinavian countries with robust gender equality systems, digital self-efficacy gaps are narrower, suggesting that broader societal equality initiatives have a positive influence on digital confidence. Conversely, in parts of South Asia and Sub-Saharan Africa, socio-cultural limitations, lack of foundational digital skills, and economic barriers broaden these gaps (Chakraborty, 2023; UNICEF, 2021), where women often face additional hurdles in accessing and leveraging digital tools for educational and economic advancement. These variations emphasise the urgent need for region-specific and culturally sensitive policy and curriculum development in higher education (UNESCO, 2020; Organisation for Economic Co-operation and Development, 2023).

Digital Literacy Concepts and Models

Digital literacy has become an essential notion in modern education, work, and citizenship. According to the European Commission's opinion (2019), digital literacy can be defined as the ability to use digital technologies effectively and critically in learning, employment, and community life. The definition encompasses not only technical competencies but also information and media literacy competencies, underscoring the multifaceted and multidimensional nature of digital literacy. Van Deursen and Van Dijk (2019) highlight significant disparities in digital literacy, with older adults, low-income individuals, and those with lower educational attainment often lacking these crucial skills. Without digital literacy, people are unable to take full advantage of digital opportunities, leading to a widening of existing social and economic inequalities. Several theoretical models attempted to account for this complexity. Vaccari and Gardinier (2019) proposed a 3D model, placing digital literacy on technical, cognitive, and ethical dimensions, emphasising its situated and developmental nature. Similarly, Lazonder et al. (2020) present a linear developmental model of digital literacy, progressing from basic operating skills to more advanced levels of critical evaluation and ethical considerations. These models emphasise that digital literacy is fluid, not static, and evolves step by



step based on context and content utilisation. Despite these models, the precise definition of "basic" digital literacy remains a subject of dispute.

Wallis and Buckingham (2019) mention the imprecision of international definitions, which generally hinders cross-national benchmarking and education policymaking. Several educational goals and diverse cultural and technological contexts influence this definitional issue. Pedagogical responses have widened in range. Frameworks like DigComp 2.2 (Vuorikari et al., 2022) encompass competencies that extend beyond technical usage, including digital safety, digital identity management, and the critical evaluation of content. The Australian Curriculum (ACARA, 2024), for instance, includes these in learning outcomes, recognising that students are not just needed to "use" digital technologies but to use them responsibly and reflectively. Interestingly, studies in this area reveal that both attitudes and abilities influence students' online behaviour. Positive attitudes towards technology typically promote digital autonomy and collaborative interaction, whereas negative ones may hinder students' problem-solving abilities and their openness to discovering technology (Ata & Yıldırım, 2019; McGarr & McDonagh, 2021). This suggests that the educational system of digital literacy needs to take affective aspects into account as well. In addition to educational paradigms, critical academic writing needs to reconsider digital literacy as a socially and politically influenced experience. Researchers such as Selwyn (2022), Couldry and Mejias (2019), and Obia (2023) promote the application of critical digital literacy, with an emphasis on critiquing digital platforms and content that supports current power structures and social institutions. The views articulated in this context highlight that online participation is inherently biased, shaped by systemic inequalities, cultural presuppositions, and issues of agency and accessibility. Unlike skill-deficit theories emphasising measurable outputs, socio-cultural and critical theories conceptualise digital literacy as a collective social process. According to Jenkins et al. (2009), digital literacy is closely tied to identity, situational context, and power relations. Such theoretical divergences illuminate long-standing disputes in the standardisation versus contextualization debate. Focusing on such disputes, the present study integrates the technical, cognitive, and affective facets of digital literacy with gender performativity theory. Drawing on Butler's gender performativity theory, this study aims to explore how digital literacy, particularly language learning, is experienced differently based on students' gendered identities. This perspective recognises that digital literacy is not only a collection of discrete competencies but also a socially constructed phenomenon shaped by cultural norms, expectations, and everyday practices. Methodological conflicts tend to occur between positivist designs, which emphasise quantitative measurement and formalised competencies, and interpretivist designs, which favour contextual understanding and the social construction of digital meaning (Sandelowski, 2010; Vygotsky, 1978). This study explicitly navigates these conflicts by adopting a qualitative descriptive approach rooted in social constructivism, which enables a nuanced exploration of lived experiences that quantitative methods may overlook.



Digital Literacy in Language Learning

University language learning has evolved significantly from the traditional classroom or textbook environment. Modern online frameworks now support all facets of language acquisition, from vocabulary growth and pronunciation practice to facilitating intercultural communication. Identify four primary technological roles in language learning: instructional imagery, language promotion technology, value-added content, and intercultural awareness. These elements help learners engage more deeply with language in both educational and real-world contexts. Digital literacy enhances language learning by enabling learners to access, evaluate, and utilise authentic online content effectively. Argue that digital literacy supports learner autonomy in addition to promoting exposure to a range of language inputs. Learners have access to target languages beyond traditional classroom settings through multimedia texts, forums, and videos. Digital access is not sufficient; ethical information use, critical thinking, and cultural awareness are also necessary to complete language acquisition—areas where digital literacy has real effects. As students learn online tools and technological skills, along with the thoughtful use of digital materials, it significantly impacts their success in language study.

The integration of digital literacy into foreign language learning has gained much momentum, driven by the growth of online and blended learning environments that affect cultural communication and exchange patterns. Digital technology facilitates multimodal language production and reception, thereby enhancing learner autonomy and intercultural competence. These functions demonstrate how virtual and real-life immersion settings facilitate language learning. Digital information literacy also enables these processes by enabling students to ethically search, evaluate, and utilise online language content, therefore enabling critical thinking and autonomous learning (Kern, 2023). Recent studies emphasise the role of digital literacy in enabling collaborative language acquisition through social media and online exchange programs, enabling authentic communication and cultural sensitisation (Lewis & O'Dowd, 2016; Dooly & Vinagre, 2021). However, inequalities in digital skills and self-confidence can hinder equal access (Zhang et al., 2021; Nalaila et al., 2022).

Gender Perspective on Digital Literacy in Higher Education

In higher education, the integration of digital literacy in language learning is both promising and challenging when considered in the context of gender. Even though digital tools and resources are widely accessible, their effective utilisation is not equally experienced by both genders. There is proof that gender disparities continue to affect students' access, appraisal, and utilisation of digital resources in language learning (Zhang et al., 2021; Nalaila et al., 2022). The disparities extend beyond mere frequency of access or usage to encompass self-perceptions of ability, appraisal tactics, and the pedagogic impacts of digital utilisation. There is also evidence that female learners exhibit higher evaluative capabilities when judging online resources, i.e., determining reliable sources and filtering out irrelevant data. Male learners, conversely, report higher self-efficacy,



particularly in searching and navigating online contexts (Morgan et al., 2021; Harputlu & Güray, 2024). However, studies also indicate a potential disconnect between self-reported digital literacy and actual performance. This gap underscores the need for more robust assessment mechanisms and instructional scaffolding that can better support learners in developing genuine digital competencies.

Beyond functional skills, digital literacy in language learning involves broader pedagogical values, including fostering learner autonomy, critical engagement, and intercultural competence. Argue that language literacy in the digital age has as much to do with cultivating global citizenship and participatory engagement as it does with proficiency in technical skills. Here, gender is a significant factor in determining how learners interact with digital content and construct knowledge in language learning environments. Gendered processes may not only affect motivation and access but also the depth of engagement with multimodal and interactive resources (Chakraborty, 2023). To foster more equitable learning environments, curriculum design must move beyond a neutral or one-size-fits-all approach. Instead, it should incorporate gender-sensitive pedagogies that acknowledge how digital practices are shaped by identity and social context. As the Organisation for Economic Co-operation and Development (2023) emphasises, integrating gender-responsive strategies into digital literacy instruction can help address unequal learning outcomes and better reflect the diverse realities of learners in higher education. Such an approach aligns with the broader goal of fostering inclusive, responsive, and globally aware educational experiences."

Research Methodology

Research Design and Paradigm

This research employed a qualitative descriptive approach, which is highly suitable for providing an in-depth summary of a phenomenon within its natural context without transforming it into an abstract conceptualisation (Doyle et al., 2020; Sandelowski, 2010). This approach is particularly effective in conveying the raw voices, experiences, and perceptions of participants, especially in social research concerning gender and digital literacy in educational settings. As highlighted by Doyle et al. (2020) in a recent and comprehensive review, this methodology allows researchers to remain close to the data and offer rich, straightforward descriptions of participants' views. Unlike grounded theory or phenomenology, which necessitate theoretical abstraction or a deeper exploration of lived experience, the descriptive approach aims to present the data as it is, making it most appropriate for this study, which examines students' gendered perceptions of using digital tools for language learning. The research was underpinned by social constructivist theory, a foundational framework in educational research that posits knowledge is collectively constructed through interactions, social contexts, and personal interpretation (Vygotsky, 1978). The application of this theoretical framework enables an investigation into gender dynamics in educational environments, with a specific focus on how sociocultural contexts and communication influence these interactions.



Sample and Participants

The research sample consisted of 120 university students in Medan, comprising 56 male and 64 female participants, ensuring a gender-balanced representation. Respondents were selected using a blended sampling strategy that integrated both purposive sampling and convenience sampling techniques. Purposive sampling was initially applied to ensure that participants met specific inclusion criteria: being active university students (aged 18-25 years old) currently enrolled as undergraduates in universities across Medan, and actively utilising digital platforms (e.g., educational apps, websites, or social media) for English language learning. This rigorous selection ensured that all participants possessed relevant experience with the phenomenon under study. Subsequently, convenience sampling was utilised for recruitment through various online channels, including campus forums, student WhatsApp groups, and academic social media platforms. This facilitated practical access to a broad pool of students who fulfilled the initial criteria and were willing to participate voluntarily by completing an essay-based questionnaire. The inclusion of students from various public and private universities in Medan aimed to capture a more varied set of student experiences, thereby enhancing the diversity of perspectives within the sample. This combined approach enabled the precise targeting of characteristics essential for the study and the practical recruitment of a sufficient number of participants, while striving to minimise selection bias. Upon providing informed consent, participants received a link to a digital questionnaire. The intentionally gender-balanced sample was crucial for enabling meaningful comparative insights into the confidence levels, participation patterns, and perceptions of male and female students regarding gender differences in digital literacy and digital-based language learning environments.

Instruments and Procedures

The primary data collection instrument was an open-ended essay questionnaire, composed of five exploratory questions specifically designed to investigate students' experiences with digital tools in language learning and their perceptions of gender-related issues. The decision to use only five questions was intentional, aiming to elicit in-depth, reflective responses rather than superficial answers, consistent with the qualitative nature of the study. This concise approach was adopted to minimise participant fatigue and maximise the quality and richness of their narrative responses on complex topics such as gendered perceptions and experiences. The questions were structured as follows:

Table 1

Questionnaire Items

NO	Questions
1.	How do you use digital technology (e.g., apps, websites, social media) in language learning? Provide examples.
2.	How confident are you in using digital tools for learning? Is there a gender difference?



-
3. Do you perceive any gender differences in digital literacy skills among students?

 4. Have you ever felt excluded or unsupported in digital learning due to gender? If yes, explain.

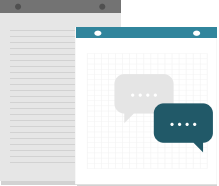
 5. Do you think your professor's teaching approach considers gender in digital literacy?

These questions were formulated based on a comprehensive review of recent literature on gender, technology, and language learning (e.g., Jaya & Sucipto, 2023; Pangrazio et al., 2020). While Ng's (2012) foundational digital literacy model initially informed the understanding of these areas, the current questions are refined through contemporary scholarship, ensuring relevance to current digital and gender dynamics. Each question was specifically crafted to encourage reflection, promote detailed responses, and avoid simple yes/no answers. To ensure instrument validity, the draft questionnaire was submitted to two academic experts specialising in educational technology and gender studies. They evaluated the items based on their clarity, relevance, and neutrality. Feedback from this review led to refinements in word choice, question sequence, and instructions, thereby improving both face validity and content validity. Before full deployment, a pilot test of the questionnaire was conducted with 15 university students (8 female, 7 male) who were not part of the main study sample. The pilot test aimed to assess the clarity of the questions, estimate the time required for completion, and identify any potential ambiguities or technical issues with the Google Forms platform. Minor adjustments were made to the phrasing of Questions 2 and 4 based on pilot feedback to ensure better comprehension and richer responses from the main study participants. Data were collected via Google Forms over a period of two weeks. The anonymity of responses was emphasised to foster openness. The form also included an initial consent statement and a brief demographic section (including age, gender, and significant).

Data Analysis Procedures

The data were analysed using thematic analysis, following the systematic six-step process proposed by Braun and Clarke (2021), a widely recognised and robust method for qualitative data analysis.

First, Familiarisation: The researcher immersed themselves in the data by reading through all participant responses multiple times to gain an initial understanding of the breadth and depth of the content. This iterative reading helped to identify recurring ideas and patterns. Second, Generating Initial Codes: During this phase, initial codes were manually assigned to words, phrases, or ideas that were relevant to digital literacy, gender, and learning behaviours. This involved a line-by-line coding process to capture granular insights. Third, Searching for Themes: Related codes were then grouped into broader, more meaningful categories or potential themes (e.g., confidence levels in digital tasks, manifestations of gender bias in learning environments, perceptions of inclusivity). Fourth, Reviewing Themes: Each potential theme was rigorously reviewed to ensure internal consistency (coherence within the theme) and external distinction (clear differentiation from other themes). This involved checking if the data within a theme truly belonged there and if the theme itself was distinct enough. Fifth, Defining and Naming Themes: Themes were refined, clearly defined,



and given descriptive names that accurately reflected their core meaning (e.g., “Gendered Self-Confidence in Tech Use”, “Perceived Bias from Faculty”). This step ensured that each theme captured a specific aspect of the data relevant to the research questions. Finally, the report was produced by compiling and presenting the synthesised findings, with direct quotations from participants strategically integrated to illustrate and support key points, thereby providing rich empirical evidence.

The data analysis process was recursive, allowing the researcher to revisit earlier steps when needed to ensure depth and accuracy. An audit trail was meticulously kept to ensure transparency of the analytical decisions, and two peer researchers independently coded a portion of the data, enhancing inter-coder agreement and analytic reliability.

Research Ethical Considerations

Ethical conduct was maintained rigorously throughout the research process. The study was reviewed and approved by the Institutional Review Board (IRB) at Universitas Negeri Medan. Ethical practices adhered strictly to the standards established by the British Educational Research Association and the American Psychological Association (APA, 2017, amended 2021), ensuring the protection and well-being of all participants.

Key ethical actions implemented included:

1. Informed consent: Prior to participation, all students were provided with comprehensive information about the research’s purpose, procedures, potential risks, and their rights, including the right to withdraw at any time. Written consent was obtained from each participant.
2. Anonymity and confidentiality: Strict measures were taken to ensure that no identifying information was collected. All responses were de-identified immediately upon receipt and stored securely on password-protected devices, accessible only to the primary researcher for academic purposes.
3. Voluntary participation: Participation in the study was entirely voluntary, and participants were explicitly informed that they could withdraw at any stage without penalty or negative consequences.
4. Data protection: All collected data were encrypted and stored on a secure, password-protected device, ensuring privacy and preventing unauthorised access.

These ethical principles ensured respect for participant autonomy, safeguarded their privacy, and minimised any potential harm, upholding the highest standards of research integrity.

Validity and Reliability Strategies

To strengthen the trustworthiness and rigour of this qualitative study, several strategies were systematically employed based on Lincoln and Guba’s (1985) widely recognised foundational



framework for establishing qualitative research quality, which remains a cornerstone in contemporary qualitative methodology (e.g., Tracy, 2019).

Firstly, Credibility was achieved through two primary methods: member checking and peer debriefing. A subset of participants was contacted after the analysis to verify the accuracy of the interpreted themes and ensure that the findings resonated with their lived experiences. Additionally, two academic peers, experienced in qualitative research, independently reviewed the thematic structure and coding process, offering critical feedback and enhancing the robustness of the interpretations. Secondly, Transferability was enhanced through thick descriptions of the research context, participant characteristics, and study settings. This detailed contextual information allows readers to assess the applicability of the findings to other similar environments, rather than claiming direct generalizability.

Thirdly, Dependability was maintained through a clear audit trail that meticulously documented decision-making throughout the entire research process, from data collection and coding to theme development. This transparent record ensures that the research process is logical, traceable, and consistent. Finally, Confirmability was ensured as the researcher maintained a reflexive journal throughout the study. This journal served to monitor and acknowledge potential biases or preconceptions, thereby ensuring that the findings were authentically grounded in participants' actual responses rather than being influenced by the researcher's assumptions.

Furthermore, instrument validation was supported by expert review and pre-testing of the questionnaire, which ensured its clarity, relevance, and neutrality (Tracy, 2019). Inter-coder reliability was increased by using collaborative theme generation and independent coding by peer researchers. The overall research design and process were maintained to be methodologically transparent, thereby allowing for potential replication or adaptation in similar research contexts, further contributing to the study's scientific rigour.

Result

This section presents an analysis of questionnaire responses gathered from 120 university students in Medan, comprising 56 male and 64 female participants. The analysis is structured around five guiding questions, which are aligned with the study's research aims: (1) How do male and female university students perceive their digital literacy in language learning through a gendered lens? Moreover, (2) Why do pedagogical and institutional practices reflect or challenge gendered experiences in digital language learning? The data were analysed using a thematic analysis approach, which involved three distinct phases: open coding for identifying key concepts and ideas; axial coding for categorising related codes; and selective coding for integrating these codes into overarching themes. To effectively illustrate common perspectives, representative quotes were carefully selected and presented in naturalistic, authentic university-level English.

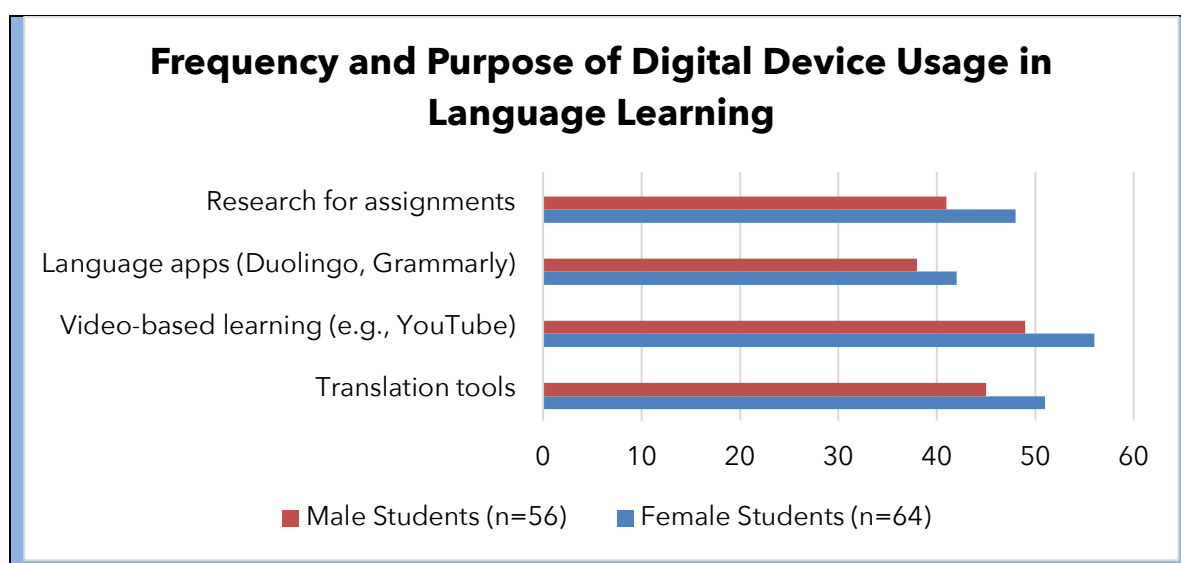


Regarding the first guiding question, "How do you use digital devices in your language learning process?", most students reported frequent use of digital devices, particularly smartphones and laptops. These devices were primarily used for accessing English learning materials, watching educational content, translating, and utilising various language applications, such as Duolingo and Grammarly. For example, one female student stated, "I always use my smartphone to open online dictionaries and grammar tools whenever I am doing assignments." A male student similarly commented, "I often use my laptop to download English e-books and practice listening on YouTube." Another student noted the practicality, "Using digital apps helps me revise grammar on the go, especially with apps like Grammarly – it is fast and practical." A female student further shared, "I prefer using YouTube channels with native speakers because it helps me pick up intonation naturally." These responses collectively indicate that digital tools serve as both essential academic resources and personal learning aids in the students' language acquisition journeys.

The frequency and purpose of digital device usage are further detailed in Figure 1.

Figure 1

Frequency and Purpose of Digital Device Usage in Language Learning



Addressing the second question, "What digital literacy skills do you consider essential in language learning, and which ones do you possess?", students highlighted several crucial skills, including searching for academic content, creating digital documents, delivering visual presentations, and engaging in online collaboration. Notably, female students frequently reported using creative platforms like Canva and CapCut, while male students emphasised their use of productivity tools such as PowerPoint and language-learning games. A female student articulated her experience, stating, "I use Canva a lot for English presentations—it is simple, and I can express my ideas more creatively." A male student explained his preference, "Team-based games improve my listening skills because communication is key. I pick up new English terms while playing." Overall,



most respondents underscored adaptability, digital collaboration, and autonomous learning as fundamental digital skills.

For the third question, "How confident do you feel using digital tools in your language learning, and do you think gender plays a role in this confidence?", both male and female students generally expressed moderate to high levels of confidence. However, a nuanced difference emerged: female students often linked their confidence to the availability of support and explicit instruction, whereas male students reported comfort with independent experimentation more frequently. For instance, one female student remarked, "If I am shown once, I can usually handle it. However, if not, I am hesitant—I do not want to make a mistake." In contrast, a male counterpart expressed a different learning approach: "I just click and try everything. If it crashes, I will figure it out. That is how I learn." These insights suggest that confidence in digital tool usage is influenced more by individual learning styles and the presence of encouragement and exposure than by gender alone.

The fourth question explored whether students felt that "institutional or teaching practices favoured one gender over another in digital language learning." While no students explicitly reported instances of overt gender bias within institutional policies, they did observe gendered patterns in assigned classroom roles during collaborative digital learning activities. Specifically, male students were often assigned technical responsibilities, such as handling devices or coding tasks, while female students typically undertook creative or administrative duties. One student reflected on this observation: "When we do group projects, it is always the boys handling the laptop and coding stuff. We girls usually write or design. No one says it directly—it just happens." These recurring patterns suggest implicit gender expectations in classroom collaboration, even in the absence of explicit favouritism.

Finally, regarding the fifth question, "What challenges do you face in accessing or mastering digital tools for language learning, and do these challenges differ by gender?", common barriers identified included hardware limitations and a general lack of adequate digital training. However, attitudes towards experimentation varied between genders. Female students often cited hesitation and a fear of making errors as significant challenges. A female student noted, "Even if I have the app, I am scared I will press the wrong thing and ruin it." Conversely, male students more frequently emphasised technical constraints as their primary challenges. A male student remarked, "I use what I have, even if it is slow. However, sometimes, I wish we had better internet or proper tutorials."

Table 2 provides a summary of these perceived challenges in digital literacy development.

Table 2

Challenges in Digital Literacy Development

Challenge	Female Students	Male Students
Limited training opportunities	29	21



Hesitancy in trying new tools	38	15
Device or internet limitations	24	25
Lack of institutional support	20	17

Gendered Perceptions in Digital Literacy

This section addresses the first research question: How do male and female university students perceive their digital literacy in the context of language learning through a gendered lens? Analysis of the collected data robustly indicates that female university students frequently engage with creative digital tools—such as Canva, CapCut, and pronunciation-focused YouTube channels—often demonstrating a degree of hesitation, driven by a fear of error or lack of clear guidance, when confronted with technical difficulties or unfamiliar interfaces. This preference for structured or visually-oriented tools aligns with their stated desire for clarity and support. Conversely, male students tend to prefer functional tools like Grammarly and PowerPoint for analytical and organisational tasks, exhibiting confidence characterised by a proactive trial-and-error approach and a willingness to explore independently, even in the face of technical ambiguities. These patterns affirm that while both genders possess digital capabilities, their methods of tool selection, utilisation, and underlying confidence are significantly influenced by gender, reflecting deeply embedded socio-psychological factors and perceived societal norms rather than intrinsic ability. The findings suggest that female students are more risk-averse in digital exploration, while male students are more technically adventurous.

Institutional Practices Sustain Gendered Roles

This section addresses the second research question: Why do institutional practices and teaching approaches contribute to gendered digital literacy experiences among university students in language learning? Even when instructors explicitly aim for gender-neutral teaching, the study reveals that institutional and classroom practices subtly contribute to the perpetuation of traditional gender-segregated roles within digital learning environments. Male students are commonly, albeit implicitly, assigned responsibilities involving technical setup, troubleshooting, and software management, reflecting a societal expectation of male technical aptitude. In contrast, female students typically manage writing, design, and organisational components of digital tasks, often gravitating towards roles that emphasise communication and aesthetics. Furthermore, challenges in digital access and mastery manifest differently across genders: male students more frequently report issues related to inadequate infrastructure (e.g., slow internet, outdated devices), while female students more often cite psychological barriers such as a lack of self-confidence in their technical abilities and insufficient explicit guidance. This dynamic suggests that educational environments, through implicit cues and task assignments, can inadvertently reinforce and exacerbate existing digital inequalities between genders, resulting in differential development of digital skill sets.



Discussion

The findings of this study provide compelling evidence that gender-based perceptions significantly influence students' engagement with digital tools for language learning, directly addressing how these perceptions manifest. The observation that female students commonly gravitate toward creative applications and exhibit caution when exploring new technologies, while male students display greater confidence and a propensity for independent experimentation, aligns with broader literature. For instance, Safari et al. (2024) demonstrate how social and economic barriers disproportionately impact women's digital engagement. Volman and van Eck (2001) and Ong and Lai (2006) also noted women's low self-confidence in ICT due to gender-insensitive learning environments. Similarly, studies by Gebhardt et al. (2019) and more recent work (e.g., Aristei & Gallo, 2022) consistently note lower digital self-confidence among women, often attributing this to culturally ingrained gender-insensitive learning environments. A particularly notable finding in our study is the significant internal doubts expressed by female students—a fear of making errors—even when their objective digital abilities appear equal or superior to those of their male counterparts. This highlights a critical psycho-social barrier that often goes unaddressed in digital literacy initiatives, suggesting that confidence-building interventions are as crucial as skill acquisition for female learners.

Another key finding reveals that institutional and teaching practices subtly reinforce existing gender roles, explaining why these differential experiences occur. Male students are more frequently assigned technical tasks in classroom settings, while female students are predominantly involved in writing and design activities. This mirrors Lafifa and Rosana's (2022) observations that men often demonstrate perceived superiority in ICT use, while women excel in information searching and creative design skills. Reports from EIGE (2021) and UNICEF (2021) further support these trends, finding that young women frequently lack digital confidence despite their active participation in creative digital endeavours. The studies by Patty (2025) in Indonesia specifically indicated that students felt less confident exploring applications independently, a finding also reflected by our female participants. Furthermore, UN Women (2023), Pelaez-Sanchez et al. (2023), and Gattorno et al. (2019) have emphasised how educational institutions can unintentionally perpetuate gender stereotypes through repetitive role assignments, a scarcity of diverse role models, and a general lack of explicit discussion about gender biases in technology. This suggests that gender inequality in digital literacy extends beyond mere access; it is also a product of deeply ingrained social and psychological constructions embedded within the educational system itself, requiring systemic interventions beyond basic technical training.

Practical Recommendations

Based on these findings, several practical recommendations emerge for higher education institutions and language educators aiming to foster more equitable digital learning environments.



1. **Develop Gender-Sensitive Digital Literacy Workshops:** Implement specialised workshops for female students focused on building confidence and encouraging independent exploration of digital tools, perhaps through low-stakes, guided experimental activities where making errors is explicitly framed as part of the learning process. These workshops should move beyond basic tool instruction to address psychological barriers, such as the fear of failure, and their impact should be regularly assessed through participant feedback and skill evaluations.
2. **Promote Diverse Role Assignment in Group Projects:** Educators should consciously intervene in group work to ensure a more equitable distribution of technical and creative tasks, actively encouraging female students to take on technical roles and male students to engage more deeply with creative and communicative aspects of digital projects. This could involve rotating roles or explicitly assigning tasks to challenge preconceived gender norms, with clear guidelines provided to all stakeholders (students, instructors).
3. **Integrate Self-Efficacy Building Exercises:** Incorporate pedagogical strategies that explicitly aim to boost digital self-efficacy for all students, with a particular focus on female learners. This could include acknowledging small successes in digital tasks, providing constructive feedback on problem-solving attempts, and showcasing diverse role models in the technology field. These exercises should be adaptable to various learning contexts and regularly evaluated for their effectiveness.
4. **Review and Revise Curriculum for Implicit Bias:** Higher education institutions should conduct an audit of their language learning curricula and pedagogical materials to identify and mitigate any implicit biases that might reinforce traditional gender roles in digital contexts. This includes ensuring that examples and case studies presented reflect diverse digital engagement patterns across genders, aligning with broader institutional policies on equity and inclusion.
5. **Provide Targeted Technical Support and Infrastructure:** While psychological barriers are crucial, continued investment in robust and accessible digital infrastructure (reliable internet, up-to-date devices, specialised software licenses) is essential, especially given that male students frequently cited these as challenges. This support should be accompanied by clear, accessible tutorials and help desks that cater to various learning styles.
6. **Establish Monitoring and Pilot Testing Mechanisms:** Implement systematic monitoring and pilot testing for all new digital literacy initiatives and pedagogical interventions. This involves collecting data on their effectiveness, gathering feedback from students and faculty, and making iterative adjustments to ensure they are contextually adaptable and align with the overarching goals of promoting gender equity in digital learning. Regular policy alignment checks should also be conducted to ensure sustained impact—study limitations.



This study, while offering valuable insights, is subject to several limitations that warrant consideration for future research. Firstly, the qualitative descriptive design, while providing rich contextual detail, inherently limits the generalizability of the findings beyond the specific university student population in Medan. A larger, more geographically diverse sample, ideally employing mixed-methods approaches, would enhance external validity. Secondly, the reliance on self-reported data through open-ended questionnaires, while allowing for authentic voices, may be influenced by social desirability bias or participants' subjective interpretations of their own digital literacy and confidence levels, which may not always align with objective performance. Future research could incorporate observational components or standardised digital literacy assessments to triangulate self-reported data. Thirdly, the study did not delve deeply into the specific socio-economic backgrounds of the students beyond general university enrollment, which could offer further nuance regarding digital access and equity. Factors such as family income, access to private digital resources, and prior technology exposure from primary education could also influence gendered digital engagement. Lastly, the study focused on perceived gender differences; a more in-depth exploration of intersectional identities (e.g., how gender intersects with ethnicity, socioeconomic status, or disability) could provide a more granular understanding of digital literacy disparities in higher education.

Conclusion

This study provides compelling insights into the gendered perceptions and practices of digital literacy among university students in language learning environments. Key empirical findings indicate that while both male and female students utilise digital tools, their approaches, confidence levels, and preferred applications differ significantly. Female students often exhibit hesitation and a preference for creative tools, driven by a fear of making errors. In contrast, male students display greater confidence in independent exploration and tend to favour functional tools. Furthermore, the research reveals that institutional routines and teaching practices subtly reinforce traditional gender roles, with male students frequently assigned technical tasks and female students gravitating towards writing and design. These findings underscore that digital literacy is not merely a technical skill but is deeply gendered by social constructions and prevailing societal expectations. Conceptually, this research enriches understanding by highlighting the socio-psychological factors underlying these disparities. Practically, it implies a critical necessity for higher education institutions to implement more inclusive pedagogies and ensure an equitable distribution of responsibilities within digital learning spaces. While constrained by its localised sample and reliance on self-reported data, this study offers a foundational understanding for addressing gender inequalities in digital literacy.

Suggestions for Future Research

This study offers valuable insights into gendered digital literacy in language learning; however, its limitations, stemming from a geographically localised sample of students from Medan and the



use of self-reported data, provide avenues for future research. Future research should aim to expand its geographic scope by extending its reach to cover representative areas across Indonesia or by making cross-national comparisons to establish regional or cultural variations in gendered digital practices.

1. **Employ Longitudinal Designs:** Utilise longitudinal studies to gain a clearer understanding of how gendered perceptions of digital literacy evolve, particularly in relation to shifts in education policy or digital infrastructure upgrades.
2. **Implement Mixed-Methods Approaches:** Incorporate experimental or mixed-methods designs to examine the impact of specific interventions—such as gender-aware digital literacy teaching—on outcomes like student motivation, self-efficacy, and academic achievement.
3. **Explore Intersectional Identities:** Investigate the addition of other dimensions of identity, including socioeconomic status, the urban-rural divide, and disability, as these facets can intersect with gender and significantly influence opportunities for digital learning.
4. **Include Stakeholder Perspectives:** Incorporate the perspectives of educators and policymakers in future studies to explore how institution-wide initiatives may either support or counteract gendered practices. Such studies would yield practical recommendations for developing comprehensive and inclusive digital learning spaces that address the needs of all students.

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Conflict of Interest

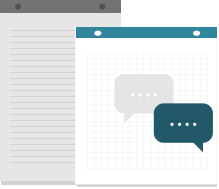
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