Jo-ELT (Journal of English Language Teaching)
Fakultas Pendidikan Bahasa dan Seni
Program Studi Pendidikan Bahasa Inggris IKIP
https://e-journal.undikma.ac.id/index.php/joelt
Email: joelt@undikma.ac.id

June 2026. Vol. 13 No. 1
e-ISSN: 2548-5865
p-ISSN: 2355-0309
pp.1-17
https://doi.org/10.33394/jo-elt.v13i1.19230

CHALLENGES OF DIGITAL LEARNING IN ENGLISH READING CLASSROOMS: A QUALITATIVE STUDY OF STUDENTS WITH DIVERSE LEARNING STYLES

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ABSTRACT

The integration of digital learning tools has transformed teaching and learning practices, particularly in English reading classrooms. While digital learning offers flexibility and access to diverse multimedia resources, its effectiveness is influenced by students' varied learning styles. This study aims to examine the challenges experienced by visual, auditory, and kinesthetic learners in digital English reading environments. A qualitative case study design was employed. Data were collected from 64 undergraduate students using the Barsch Learning Style Inventory, from which 15 participants representing different learning styles were purposively selected for in-depth interviews. The participants were drawn from a private university and had prior experience with both face-to-face and digital learning contexts. The findings reveal several key challenges, including internet connectivity issues, screen-related discomfort, device limitations, limited interactivity, and digital distractions. These challenges affect learners differently: visual learners struggle with limited visual interaction, auditory learners are affected by disrupted audio input, and kinesthetic learners face difficulties engaging in less interactive environments. The study highlights that digital learning challenges are not experienced uniformly but are shaped by learners' preferences. It underscores the need for more inclusive and multimodal digital learning designs to enhance student engagement and learning outcomes.

ARTICLE INFO

Article History:
Received: 11 January 2026
1st revision: 6 March 2026
2nd revision: 28 April 2026
Accepted: 16 May 2026
Published: 30 June 2026

Keywords:
Digital learning;
Learning styles;
English reading classrooms;
Educational challenge

How to cite: Astri, Z., Nuraeni, N., Wahab, I., & Aisyah, S. (2026). Challenges of Digital Learning in English Reading Classrooms: A Qualitative Study of Students with Diverse Learning Styles. *Jo-ELT (Journal of English Language Teaching) Fakultas Pendidikan Bahasa & Seni Prodi Pendidikan Bahasa Inggris IKIP*, *13*(1), 1–17. https://doi.org/10.33394/jo-elt.v13i1.19230

INTRODUCTION

In recent years, the integration of digital learning tools in educational settings has transformed the landscape of teaching and learning (Astri et al., 2024; Basak et al., 2018; Boghian et al., 2019; Garrison & Kanuka, 2004). Digital learning offers a range of benefits including flexibility, accessibility, and a variety of engaging multimedia resources (Blayone et al., 2018; Lee, 2019; Ni'mah et al., 2023; Tarigan et al., 2021; Zamista & Azmi, 2023). In

English language education, particularly in reading classrooms, digital learning environments enable students to access a wide range of digital texts, multimedia materials, and online resources that can enhance their reading comprehension and learning engagement.

Although the rapid transition to online learning during the COVID-19 pandemic has passed, it played a significant role in accelerating the adoption of digital learning and reshaping current educational practices (Anggeraini et al., 2022; Baticulon et al., 2021; Firman & Rahayu, 2020; Jamilah et al., 2021). Many higher education institutions continue to implement blended and technology-enhanced learning as part of their instructional approaches. However, several challenges remain in digital learning environments, including unstable internet connectivity, screen-related discomfort, device reliability issues, the need for interactive learning, and digital distractions (Argawati & Suryani, 2020; Hakimi et al., 2024; Jamilah et al., 2021; Rahmawati & Sujono, 2021; Yeh & Tsai, 2022).

Beyond technological and infrastructural constraints, the effectiveness of digital learning is also influenced by students' diverse learning styles. Learning styles refer to individuals' preferred ways of receiving, processing, and retaining information, commonly categorized into visual, auditory, and kinesthetic styles (Yulhendri et al., 2022; Maphosa et al., 2022). These differences influence how students interact with learning materials and instructional strategies, with multimodal and multimedia resources supporting engagement and effectiveness in digital contexts (Yulhendri et al., 2022; Maphosa et al., 2022).

In digital learning environments, visual learners may benefit from multimedia and visual representations; auditory learners may rely on spoken explanations or audio resources; while kinesthetic learners may prefer interactive and activity-based learning experiences (Yulhendri et al., 2022; Maphosa et al., 2022). The body of evidence supports the value of integrating visual, auditory, and kinesthetic elements (e.g., videos, podcasts, simulations, and interactive activities) to accommodate diverse preferences and bolster engagement and learning outcomes in online and blended settings (Maphosa et al., 2022; Sobeeh et al., 2024).

However, although numerous studies have examined digital learning challenges, most have approached the issue from a general perspective without considering how these challenges are experienced differently by students with diverse learning styles. In particular, limited research has examined how learning styles influence students' experiences in digital English reading classrooms, where learning requires both cognitive engagement and interaction with textual materials.

Therefore, this study aims to investigate the challenges faced by students with diverse learning styles in digital English reading classrooms in higher education. By examining these challenges through the lens of learning styles, this research seeks to provide deeper insights into how digital learning environments can be designed to better accommodate the diverse needs of learners.

RESEARCH METHOD

Research Design

Based on the nature of the research questions, this study employed a qualitative approach to explore the challenges experienced by students with different learning styles in digital English reading classrooms. Qualitative research is appropriate for examining social and educational phenomena in depth and for gaining a detailed understanding of participants' experiences within a specific context (Anderson & Arsenault, 2018; Creswell, 2014). Rather than aiming to generalize findings, qualitative research focuses on providing rich and contextualized insights into particular situations and settings (Miles et al., 2014).

Within this qualitative framework, a case study design was adopted. Yin (2014) defines a case study as an empirical investigation that examines a contemporary phenomenon within its real-life context. This design is particularly suitable for investigating how students

experience digital learning environments in specific educational settings. Similarly, Merriam & Tisdell (2015) emphasize that case study research allows researchers to develop a comprehensive understanding of complex educational practices and participants' experiences.

In this study, the case was bounded within a specific educational context. The case focused on undergraduate students enrolled in English reading courses at a private university in Indonesia, where digital learning has been integrated into classroom instruction. The investigation specifically examined students who had experienced both face-to-face and digital learning environments in three reading courses: Literal Reading, Interpretive Reading, and Critical Reading. The study was conducted during one academic semester in which digital learning tools were actively used in reading instruction. Defining these boundaries helped ensure that the case study remained focused on a clearly identifiable educational setting.

This context was selected because the university has actively implemented digital learning in several English reading courses, allowing students to experience both traditional and technology-enhanced learning environments. Such a setting provided an appropriate context for examining how students with different learning styles experience digital learning challenges in reading classrooms.

Participants

This study was conducted with undergraduate students at a private university in Indonesia who had experienced both traditional face-to-face learning and technology-enhanced learning environments. The students were generally between 19 and 22 years old and included both male and female participants. These students were considered appropriate participants because they were familiar with both learning modes and had experience using digital learning tools in their courses.

A total of 64 undergraduate students enrolled in three reading courses, Literal Reading, Interpretive Reading, and Critical Reading, participated in the initial stage of the study. In this phase, students completed the Barsch Learning Style Inventory (Barsch, 1980) to identify their preferred learning styles.

Based on the results of the learning style inventory, 15 students were purposively selected for semi-structured interviews to gain deeper insights into their experiences with digital learning. The selected participants represented the three learning style categories: visual, auditory, and kinesthetic. Five students from each learning style group were chosen to ensure balanced representation across learning styles.

Purposive sampling was used to select interview participants because this approach allows researchers to choose individuals who can provide rich and relevant information related to the research objectives (Bryman, 2012; Merriam, 2009). The selected participants had experienced both face-to-face and digital learning environments, enabling them to reflect on the challenges encountered in digital English reading classrooms.

Instruments

This study employed two instruments: the Barsch Learning Style Inventory and semi-structured one-on-one interview guidelines. These instruments were used to explore students' learning preferences and their experiences with digital learning in English reading classrooms.

The Barsch Learning Style Inventory (Barsch, 1980) was used to identify students' preferred learning styles. The inventory consists of 24 items that classify learning preferences into three categories: visual, auditory, and kinesthetic. Each item is rated using three response options: often, sometimes, and seldom. For this study, the questionnaire was administered to 64 undergraduate students. To ensure that the participants clearly understood the questions,

the inventory was presented in Indonesian, adapted from the original English version. The adaptation was conducted to maintain conceptual equivalence while improving clarity for the participants.

The scoring procedure followed the standard guidelines of the Barsch Learning Style Inventory. Responses were tabulated to determine the dominant learning style of each student based on the highest score among the three categories. The results of this inventory were then used to classify students into visual, auditory, and kinesthetic learning style groups. Prior to the main data collection, the questionnaire was reviewed and pilot-tested with a small group of students to ensure clarity of wording and comprehension of the items. Minor adjustments were made to improve readability without altering the original meaning of the instrument.

Although the concept of learning styles has been debated in contemporary educational research, with some scholars questioning the empirical evidence supporting strict categorization of learners (Pashler et al., 2008), learning style inventories continue to be used as practical tools for exploring students' learning preferences in specific educational contexts. In this study, the Barsch Learning Style Inventory was used not to rigidly categorize students, but to provide an initial framework for examining how students with different learning preferences experience challenges in digital English reading classrooms.

To gain deeper insights into students' experiences with digital learning in reading classrooms, semi-structured one-on-one interviews were conducted with 15 selected participants. One-on-one interviews allow researchers to obtain detailed information by asking participants open-ended questions and recording their responses (Creswell, 2012). The interview protocol was designed to explore several aspects of students' experiences with digital learning in reading classes. These included their experiences using digital learning tools, the challenges they encountered during digital learning activities, and how digital learning influenced their preferred learning styles. The interviews also explored difficulties related to internet connectivity, screen exposure, and device reliability, as well as students' perceptions of interaction and engagement in digital learning environments. Through these open-ended discussions, participants were encouraged to share detailed reflections on their learning experiences. The semi-structured format allowed the researcher to ask follow-up questions when necessary in order to clarify participants' responses and obtain richer qualitative insights.

Data Analysis

The data analysis technique refers to the systematic process of organizing and interpreting data in order to generate meaningful conclusions. In this study, the data were analyzed using thematic analysis following the framework proposed by Braun & Clarke (2006). Thematic analysis is widely used in qualitative research because it allows researchers to identify, analyze, and report patterns or themes within qualitative data. This method is particularly suitable for analyzing the interview data collected in this study and for addressing the research question concerning the challenges experienced by students with different learning styles in digital English reading classrooms.

The analysis began with data familiarization. At this stage, the researcher carefully reviewed the results obtained from the Barsch Learning Style Inventory and repeatedly read the interview transcripts to gain a deeper understanding of the participants' responses. This process helped the researcher identify preliminary patterns related to students' experiences with digital learning environments.

The next step involved generating initial codes by identifying meaningful statements from the interview transcripts that reflected the challenges faced by students during digital learning. Coding refers to the process of assigning labels to segments of data in order to represent or summarize key ideas (Adu, 2019). During this stage, the researcher focused on

aspects that were closely related to the research question, such as internet connectivity issues, screen-related discomfort, device reliability, the need for interactive learning, and digital distractions.

After the coding process, similar codes were grouped into broader categories to identify patterns across participants' responses. These categories were then reviewed and refined to develop broader themes that represent the major challenges experienced by students in digital English reading classrooms. This process involved continuously reviewing the data and comparing codes to ensure that the resulting themes accurately reflected the participants' experiences (Miles et al., 2014).

Through this systematic process of familiarization, coding, categorization, and theme development, the thematic analysis enabled the researcher to establish clear connections between the research questions, the coding process, and the final themes that emerged from the data.

To enhance the trustworthiness of the study, several strategies were applied. Credibility was strengthened through repeated reading of interview transcripts and careful comparison between participants' responses and the emerging themes. Dependability was supported by maintaining a systematic coding process during thematic analysis. In addition, the use of multiple data sources, including the learning style inventory and semi-structured interviews, allowed for methodological triangulation. These procedures helped ensure that the findings accurately represented participants' experiences.

RESEARCH FINDINGS AND DISCUSSION

Research Findings

To explore the integration of digital learning in reading classrooms, it's essential to understand the diverse landscape of learning styles among students. Digital learning, characterized by the use of electronic resources to facilitate education, offers a plethora of benefits, including accessibility, flexibility, and a wide range of learning materials. However, its effectiveness is heavily contingent upon its alignment with the various learning styles of students. Learning styles, a concept that categorizes individuals based on their preferred way of absorbing, processing, and retaining information, significantly influence how students interact with digital content. This finding aims to delve into the challenges posed by digital learning in reading classrooms, particularly for students with different learning styles.

Theme 1: Internet and Connectivity

Internet connectivity emerged as one of the most frequently reported challenges experienced by students in digital reading classrooms. Participants across different learning styles indicated that unstable internet connections and limited data quotas often disrupted their ability to access and engage with digital learning materials.

For visual learners, connectivity problems affected their ability to access visual learning resources such as videos or online platforms that were commonly used during digital learning sessions. One participant explained that when watching learning materials on platforms such as YouTube, it was difficult to ask questions or clarify misunderstandings when network issues occurred. As one student stated, "The problem is, if you don't understand something on YouTube, it's hard to ask questions because it's not direct, and there are network issues" (S1). Other visual learners also mentioned difficulties related to unstable internet connections and limited internet quotas (S2; S5), which sometimes prevented them from fully accessing digital learning content.

Similarly, auditory learners emphasized the importance of stable internet connections for following spoken explanations during online learning sessions. Interruptions in connectivity often affected their ability to clearly hear and understand the lecturer's

explanations. One participant noted, "The main problem for me is the internet network, mam" (S7), while others also reported that unstable connections and limited internet access made it difficult to follow audio-based explanations during lessons (S6; S9).

Kinesthetic learners also reported connectivity-related challenges, particularly when internet disruptions affected their participation in online learning activities. One participant described how online sessions sometimes experienced delays or lagging due to unstable internet connections, which interrupted the learning process (S12). Although kinesthetic learners tend to prefer more interactive or hands-on learning activities, reliable internet connectivity remained a fundamental requirement for accessing digital learning environments.

These findings indicate that while internet connectivity issues were experienced by students across all learning styles, the way these challenges affected their learning experiences varied depending on their preferred learning styles.

Theme 2: Screen-Related Discomfort Across Learning Styles

Screen-related discomfort emerged as another challenge reported by students during digital learning activities. Participants across different learning styles indicated that prolonged exposure to screens during online learning often caused eye strain and physical discomfort.

Visual learners were particularly sensitive to the visual intensity of prolonged screen exposure. One participant explained that staring at a phone or laptop screen for extended periods caused discomfort in the eyes, stating, "If I look at the light from the phone or laptop for too long, it kind of hurts my eyes, mam" (S4). Other visual learners also mentioned that technical issues, such as unstable internet connections, sometimes required them to spend more time in front of the screen when accessing learning materials (S5).

Auditory learners reported similar concerns regarding prolonged screen use. Although their learning preference relies more on listening, they still need to look at screens to access digital learning platforms. One participant stated, "It's the same for me, mam, the health factor of the eyes can't stare at the screen for too long" (S6). Another student also mentioned internet connectivity problems that sometimes prolonged their screen exposure when trying to access online materials (S9).

Kinesthetic learners also described discomfort related to extended screen use during digital learning sessions. One participant noted that technical issues such as lagging during online classes sometimes caused devices to overheat, which disrupted the learning process (S12). Although kinesthetic learners generally prefer more active or hands-on learning activities, they still experienced similar physical discomfort when required to spend long periods interacting with digital devices.

The findings indicate that prolonged screen exposure was experienced as a common challenge among students, although the ways in which it affected their learning experiences varied depending on their learning styles.

Theme 3: Device Reliability Concerns in Learning Environments

Device reliability emerged as another challenge reported by students in digital learning environments. Participants indicated that technical problems such as slow device performance, system errors, or device overheating occasionally disrupted their participation in online learning activities.

Visual learners reported that device-related problems sometimes made it difficult to access digital learning materials effectively. One participant explained that in addition to internet connectivity issues, the devices used for accessing online learning platforms occasionally experienced technical problems, which affected their ability to follow the

learning materials (S2). Such technical limitations could interrupt students' engagement with visual learning resources during digital learning sessions.

Auditory learners also reported similar experiences related to device performance. One participant mentioned that in addition to unstable internet connections and limited data access, the mobile phone used for online learning sometimes became slow or unresponsive during lessons. As the participant explained, "Internet network problems, limited quotas, and sometimes the cell phone I use is slow or goes blank" (S9). These technical issues occasionally made it difficult for students to follow explanations during digital learning sessions. These responses indicate that device reliability can influence students' learning experiences in digital environments. Technical problems related to device performance, together with connectivity issues, may interrupt students' access to learning materials and participation in online learning activities.

Theme 4: Need for Interactive Learning

The need for interactive learning emerged as another challenge reported by students in digital reading classrooms. Several participants indicated that limited opportunities for interaction during online learning sometimes made it difficult for them to fully understand the learning materials.

Visual learners emphasized that digital platforms used in learning did not always allow immediate interaction with the lecturer. One participant explained that when learning materials were delivered through platforms such as YouTube, it was difficult to ask questions or clarify misunderstandings. As one student stated, "It's difficult to ask questions on YouTube if you don't understand something because it's not direct, and there are network issues" (S1). This experience suggests that limited opportunities for direct interaction may affect students' engagement during digital learning sessions.

Kinesthetic learners also highlighted the importance of direct interaction in understanding the learning materials. One participant expressed that explanations from the lecturer played a crucial role in helping them understand the lesson, stating, "I cannot understand if it is not explained by the lecturer" (S14). This response indicates that some students require more interactive learning experiences in order to follow the learning process effectively.

The findings indicate that interaction with lecturers and learning materials plays an important role in supporting students' understanding during digital learning activities.

Theme 5 : Digital Distractions (Distraction from social media)

Digital distractions also emerged as a challenge experienced by students during digital learning activities. Some participants reported that notifications from social media applications occasionally interrupted their concentration while accessing online learning materials.

One kinesthetic learner described how social media notifications often appeared while searching for learning resources online. As the participant explained, "I sometimes face obstacles when I want to search for materials through Google and such because if social media notifications come in..." (S11). These interruptions sometimes diverted the student's attention from the learning task and disrupted the learning process.

This finding indicates that digital distractions, particularly from social media notifications, can interfere with students' focus during digital learning activities.

Shared Challenges

In a digital education ecosystem, where learning resources are predominantly accessed online, two significant shared challenges emerge across various learning styles: internet

connectivity issues and screen-related discomfort. These challenges cut across the experiential boundaries of visual, auditory, and kinesthetic learners, revealing fundamental areas that need to be addressed to ensure the effectiveness and inclusivity of digital learning.

Internet and Connectivity: The issue of internet connectivity stands out as a universal barrier, impacting students regardless of their preferred learning style. Connectivity is the backbone of online learning, and when it fails, the very essence of digital education is compromised. For visual learners, who often rely on high-quality images and videos to grasp concepts, a poor connection can hinder their ability to engage with visual content. Auditory learners face similar frustrations when audio streams are interrupted, which can disrupt the flow of information and break concentration. Kinesthetic learners, who might depend on internet connectivity to access interactive simulations or resources that facilitate hands-on learning, also find themselves at a significant disadvantage when connectivity issues arise.

The shared frustration with internet issues reflects a collective need for reliable and robust digital infrastructure. This need transcends personal learning preferences and highlights a critical area where educational institutions and policymakers must invest to ensure that learning can occur without hindrance.

Screen-Related Discomfort: Another shared challenge that arises from the interviews is the discomfort associated with prolonged screen use. The digital shift in education means that students are spending increased amounts of time in front of screens, which can lead to eye strain, headaches, and other forms of physical discomfort. This phenomenon is not restricted to one type of learner; rather, it is a widespread condition experienced by all.

For visual learners, screen-related discomfort may be exacerbated by the nature of their learning materials, which often require close and prolonged attention to visual details. Auditory learners, though their focus may be on listening, still spend significant time looking at screens to navigate to their auditory materials. Kinesthetic learners, while they may not rely as heavily on visual content, still need to read instructions or research on digital devices, subjecting them to similar strains.

This convergence on the issue of screen-related discomfort calls for a multi-faceted approach to digital well-being. Solutions could include the design of educational content that minimizes the need for continuous screen engagement, the use of ergonomic displays, and the promotion of best practices for reducing eye strain, such as the 20-20-20 rule (every 20 minutes, look at something 20 feet away for 20 seconds).

In summary, these shared challenges reflect broader systemic issues in the digital learning environment that require collective attention and action. Addressing them is essential for creating equitable and comfortable learning experiences for all students. As digital learning continues to evolve, it is imperative that these common challenges are mitigated through strategic planning, technological innovation, and educational policy reform.

Unique Challenges

In the digital learning environment, while some challenges are universally felt, each learning style also confronts unique hurdles that reflect their specific educational needs and preferences. These distinct challenges emphasize the importance of versatile educational strategies to ensure that the full spectrum of learners can engage and benefit from digital learning platforms.

Visual learners thrive on engaging with content that they can see. This includes diagrams, infographics, and videos that are often found in abundance on platforms like YouTube. However, a unique challenge arises for these learners in digital spaces that lack interactivity. One visual learner puts it this way: "It's difficult to ask questions on YouTube if you don't understand something because it's not direct, and there are network issues" (Visual Learner, S1). This remark underscores the difficulty visual learners face when they cannot

interact with the content in real-time, a limitation that can hinder their ability to clarify misunderstandings immediately and deepen their comprehension.

For auditory learners, the digital transition can introduce a barrier when auditory explanations are not readily available, and they must rely on reading from screens. This challenge is articulated by an auditory learner who states, "I cannot understand if it is not explained by the lecturer..." (Auditory Learner, S14). This learner's experience highlights the struggle when auditory content is inaccessible, and the learning material is primarily text-based, particularly when presented on small screens that can make reading more strenuous and less conducive to learning for those who prefer listening.

Kinesthetic learners face a particularly unique challenge in digital environments due to the lack of physical interaction and hands-on experiences that are essential to their learning process. The difficulty is exacerbated by digital distractions that are a click away, such as social media notifications, which kinesthetic learners find particularly disruptive. As one kinesthetic learner describes: "I sometimes face obstacles when I want to search for materials through Google and such because if social media notifications come in..." (Kinesthetic Learner, S11). This statement reveals how such interruptions not only break their concentration but also pull them away from the active, tactile engagement they need to learn effectively.

The insights from these learners underscore the critical need for digital learning platforms to evolve and accommodate various learning styles through interactive visuals, auditory resources, and kinesthetic activities. Recognizing and addressing these unique needs is essential in fostering an inclusive and effective digital learning experience for every student.

Thematic Map of Qualitative Code

Thematic qualitative analysis allows us to explore and comprehend the various facets of user experiences associated with technology. This analysis aims to depict the themes that emerge from qualitative data by providing a visualization that facilitates an understanding of the relationships between these themes and how they interconnect. In this process, we employ a coding system, which is a concise representation of ideas or concepts identified within the data. These codes are then grouped into broader themes, helping us map out patterns and relationships.

Figure 1 shows an analysis of the thematic map created based on the collected data, encompassing a range of issues related to technology use, such as internet connectivity problems, screen-related discomfort, device issues, the need for interactive learning, and digital distractions. This visualization not only aids in identifying these themes but also shows how often certain themes appear together and the significance of the relationships between codes in a broader context.

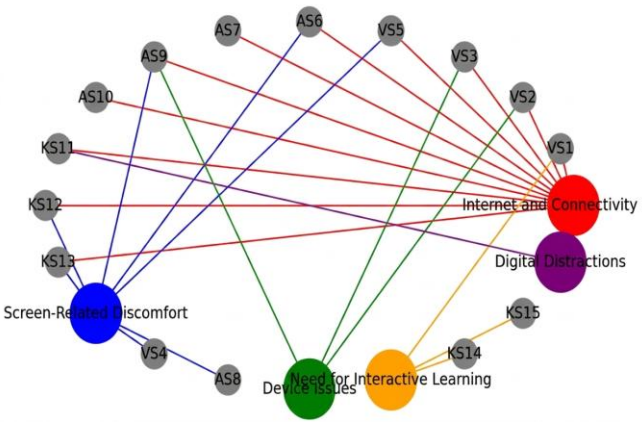

Figure 1. Thematic map of qualitative codes

In the thematic map, each theme is represented by a colored node, such as red for Internet and Connectivity Issues, blue for Screen-Related Discomfort, green for Device Issues, orange for Need for Interactive Learning, and purple for Digital Distractions. The grey nodes represent individual participant codes derived from the interview data. The colored edges connecting the nodes indicate the relationship between specific participant codes and the themes identified during the coding process.

The participant codes are labeled according to the students' learning styles. Codes VS1–VS5 refer to responses from visual learner participants, AS6–AS10 represent responses from auditory learner participants, and KS11–KS15 correspond to responses from kinesthetic learner participants. These codes illustrate how individual participants contributed to the development of each theme within the thematic analysis.

The thematic map illustrates the distribution and interconnections of the identified themes across participants' responses. Among the five themes, Internet and Connectivity Issues emerged as the most dominant, as it was linked to a wide range of codes from visual (VS1, VS2, VS3, VS5), auditory (AS6, AS7, AS9, AS10), and kinesthetic learners (KS11, KS12, KS13). This indicates that connectivity problems are a pervasive challenge experienced across different learning styles. Screen-Related Discomfort appeared as a moderately connected theme, sharing several codes with connectivity issues (e.g., VS5, AS6, AS8, KS12, KS13), suggesting that prolonged screen exposure may be intensified by unstable internet access. In contrast, Device Issues were less frequently reported and linked to fewer codes (VS2, VS3, AS9), indicating more specific and isolated technical challenges. The theme Need for Interactive Learning was primarily associated with visual and kinesthetic learners (VS1, KS14, KS15), highlighting the importance of engagement and interaction in supporting learning processes. Finally, Digital Distractions emerged as the least connected theme, represented only by one kinesthetic learner (KS11), suggesting that although it is a distinct concern, it is less widely reported compared to other challenges. Overall, the thematic map demonstrates that while some issues are broadly experienced across learning styles, others are more specific and context-dependent.

The thematic map indicates that certain issues are more pervasive and complex than others, as reflected by the number of connections associated with each theme. The overlap of codes across themes suggests that some challenges are multifaceted and interrelated, requiring more comprehensive and integrated strategies to address them. In contrast, themes with fewer connections appear to represent more specific and isolated problems, which may be addressed through targeted interventions.

This visualization facilitates a deeper understanding of the complexity of the qualitative data and supports the identification of priority areas for further investigation and intervention. It also provides a basis for considering the allocation of resources, particularly by highlighting themes with a higher density of connections and greater overlap. Overall, the map underscores the interconnected nature of the issues within the dataset and points to areas that may require either immediate attention or further exploration.

In addition to the thematic map, a stacked bar chart titled "Distribution of Issues Across Learning Styles" is presented to illustrate how these challenges are distributed among visual, auditory, and kinesthetic learners. This visualization provides a comparative overview of the frequency and distribution of issues across different learning styles and thematic categories.

Rather than merely presenting descriptive data, the chart serves as an analytical tool to identify patterns in students' reported experiences. By organizing the data into distinct categories based on learning styles, the visualization highlights which issues are more prominent among specific groups of learners. This enables a clearer understanding of how different learners experience digital learning challenges.

The insights derived from this visualization are intended to inform pedagogical decision-making and support the development of more inclusive and adaptive learning environments. In particular, the findings may guide educators in designing targeted instructional strategies and interventions that better address the diverse needs and preferences of learners in digital learning contexts.

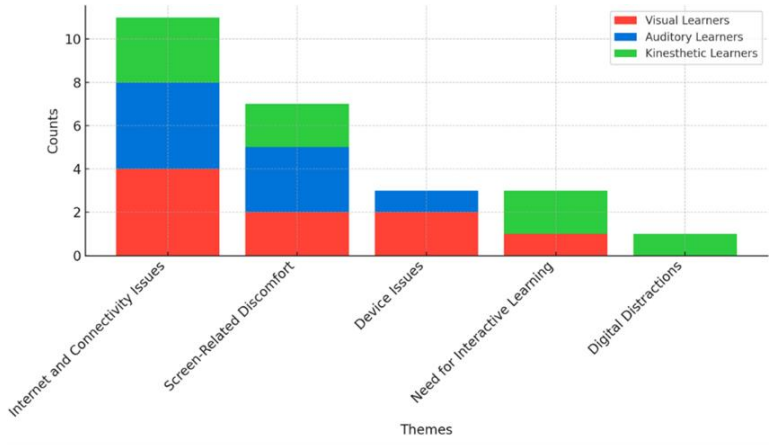

Figure 2. Distribution of issues across learning styles

Figure 2 displays the frequency of various issues encountered by students categorized by their learning preferences: Visual, Auditory, and Kinesthetic. The chart organizes the data across five different themes.

The chart analysis reveals distinct patterns in how digital learning challenges are experienced across different learning styles. Internet and Connectivity Issues emerge as the most frequently reported concern across all groups, with the highest incidence among visual learners (VS1, VS2, VS3, VS5), followed by kinesthetic (KS11, KS12, KS13) and auditory learners (AS6, AS7, AS9, AS10). This indicates that reliable internet access is a fundamental factor affecting students' learning experiences, regardless of their learning preferences.

The second most prominent theme is Screen-Related Discomfort, which affects learners across all categories. While visual learners (VS4, VS5) report this issue most frequently, it is also evident among kinesthetic (KS12, KS13) and auditory learners (AS6, AS8, AS9). This suggests that prolonged screen exposure is a common concern in digital learning environments, independent of learning style.

In comparison, Device Issues are less pervasive and are primarily reported by visual (VS2, VS3) and auditory learners (AS9). The absence of reports from kinesthetic learners may indicate either a lower dependence on device functionality or fewer encountered issues within this group.

The theme Need for Interactive Learning is predominantly associated with kinesthetic learners (KS14, KS15), reflecting their preference for active and hands-on engagement. A minor representation from visual learners (VS1) suggests that interactivity is also valued, though to a lesser extent, across other learning styles.

Meanwhile, Digital Distractions appear as the least reported theme and are identified solely among kinesthetic learners (KS11). This may indicate that learners who rely on physical engagement are more susceptible to distractions in less interactive digital environments.

The findings highlight that while certain challenges, such as internet connectivity and screen-related discomfort, are widely experienced, others are more specific to particular learning styles. These results underscore the importance of developing adaptive and inclusive digital learning strategies. In particular, ensuring stable digital infrastructure, managing

screen exposure, and incorporating interactive elements into instructional design are essential for addressing the diverse needs of learners and enhancing the overall effectiveness of digital learning environments.

Discussion

The findings of this study provide important insights into how students with different learning styles experience digital learning challenges in English reading classrooms. While digital learning offers flexibility and broader access to learning resources, it also introduces a range of technological and pedagogical constraints that shape students' engagement and comprehension (Dhawan, 2020). The results of this study suggest that the effectiveness of digital learning is not determined solely by technological factors, but is also influenced by the extent to which digital environments accommodate diverse learning preferences. This indicates that students do not experience digital learning uniformly; rather, their challenges are mediated by their preferred modes of processing information. In this regard, the findings extend previous research by demonstrating that common digital learning barriers, such as connectivity issues, screen exposure, and limited interactivity, interact differently with visual, auditory, and kinesthetic learners. Within the context of Indonesian higher education, these results highlight the importance of designing digital reading environments that are not only technologically accessible but also pedagogically responsive to diverse learner needs.

Building on these overall findings, internet connectivity emerges as a critical factor shaping students' experiences in digital English reading classrooms. As most digital reading activities rely on online platforms, including videos, learning management systems, and interactive resources, unstable internet access can significantly disrupt students' engagement and comprehension. The findings suggest that connectivity issues are not merely technical barriers; rather, they influence how learners with different learning styles process and interact with digital materials. For instance, visual learners are particularly affected when video-based content is interrupted, while auditory learners experience difficulties when audio input is disrupted. These findings are consistent with previous studies that identify unreliable internet infrastructure as a major obstacle to effective online learning (Baticulon et al., 2021; Yeh & Tsai, 2022). However, this study extends prior research by demonstrating that the impact of connectivity issues is mediated by learners' preferences, resulting in varied learning experiences across different learning styles. In the context of Indonesian higher education, this highlights the need not only to improve digital infrastructure but also to design learning materials that remain accessible and adaptable under conditions of unstable connectivity.

In addition to connectivity issues, screen-related discomfort represents another significant challenge affecting students' engagement in digital English reading classrooms. Prolonged exposure to digital screens can lead to eye strain, fatigue, and reduced concentration, which in turn may hinder students' ability to sustain attention during reading activities. The findings indicate that this issue is experienced across all learning styles, although it appears to be more pronounced among visual learners who rely heavily on processing visual information. This aligns with previous studies suggesting that excessive screen exposure can negatively impact both cognitive engagement and physical well-being in digital learning environments (Bailenson, 2021; Basak et al., 2018). However, the present study further suggests that the impact of screen-related discomfort may be intensified in reading-intensive contexts, where students are required to engage with digital texts for extended periods. Within the context of Indonesian higher education, this highlights the importance of designing digital learning practices that not only leverage technological tools but also consider students' physical comfort and cognitive endurance.

Beyond connectivity and screen-related challenges, device reliability also plays a significant role in shaping students' digital learning experiences. Technical issues such as

slow device performance, software errors, and limited storage capacity can disrupt access to learning materials and hinder participation in online activities. The findings suggest that, although less pervasive than connectivity problems, device-related issues still present meaningful barriers to effective learning. This is consistent with previous research highlighting the importance of technological infrastructure in supporting digital learning environments (Berry & Westfall, 2015; le Roux & Parry, 2017). However, the present study indicates that the impact of device limitations may vary depending on learners' preferences. For instance, visual learners may experience difficulties when multimedia content is not displayed properly, while auditory learners may be affected when device performance interferes with audio delivery. These findings underscore that even seemingly minor technical issues can have differentiated effects on students' learning experiences. In the context of Indonesian higher education, this highlights the need not only for reliable internet access but also for adequate and well-functioning digital devices to support effective engagement in digital reading activities.

In addition to the technological constraints discussed above, the findings also highlight the importance of interactive learning environments in supporting students' engagement in digital English reading classrooms. Interactivity emerges as a key factor in maintaining motivation, particularly for learners who require active involvement in the learning process. The results indicate that kinesthetic learners, in particular, benefit from opportunities that involve hands-on activities, collaborative tasks, and dynamic interaction with learning materials. This aligns with existing literature suggesting that learners process information differently based on their preferred modalities (Gilakjani, 2012). However, the present study extends this perspective by demonstrating that the absence of interactivity in digital environments may limit students' engagement, especially for those who rely on experiential and participatory learning approaches. From this perspective, digital learning environments that incorporate multimodal and interactive elements, such as combining visual, auditory, and activity-based components, are more likely to support diverse learners effectively. In the context of English reading classrooms, this suggests that reading activities should move beyond passive text consumption and instead integrate interactive strategies that encourage active engagement with content.

In addition to the previously discussed challenges, digital distractions also emerge as a factor influencing students' engagement in digital learning environments. Although less frequently reported compared to other issues, the findings indicate that distractions, particularly those related to social media and mobile device notifications, can disrupt students' focus during learning activities. This issue appears to be more evident among kinesthetic learners, who tend to require sustained engagement and active involvement to maintain concentration. In less interactive digital environments, the absence of physical or task-based engagement may increase their susceptibility to distractions. This observation is consistent with previous research indicating that the use of personal digital devices and social media can negatively affect students' attention and academic performance when not properly managed (le Roux & Parry, 2017). However, the present study suggests that the impact of digital distractions is not uniform, but varies depending on learners' engagement needs and learning preferences. In the context of digital English reading classrooms, this highlights the importance of designing structured and engaging learning activities, as well as implementing strategies to minimize distractions and support sustained student focus.

Taken together, the findings of this study demonstrate that digital learning challenges are not experienced uniformly, but are shaped by the interaction between technological conditions and learners' preferred modes of engagement. While issues such as internet connectivity and screen-related discomfort are widely experienced, their impact varies depending on how students process and interact with digital learning materials. This study,

therefore, contributes to the growing body of digital learning research by providing a more nuanced understanding of how learning styles mediate students' experiences in English reading classrooms. From a theoretical perspective, the findings support a more flexible interpretation of learning styles, suggesting that rather than strictly categorizing learners, educators should adopt multimodal and adaptive instructional approaches that accommodate diverse learning preferences. From a practical perspective, the results highlight the importance of designing digital learning environments that integrate stable technological infrastructure, interactive and multimodal learning activities, and strategies to manage screen exposure and minimize distractions. In the context of Indonesian higher education, these findings underscore the need for more inclusive and pedagogically responsive digital learning practices that can better support students' diverse needs. Finally, this study opens avenues for future research to further explore how digital learning design can be optimized to enhance engagement and learning outcomes across different learner profiles.

CONCLUSION

This study investigated the challenges experienced by students with different learning styles in digital English reading classrooms. The findings reveal that several interconnected challenges, such as internet connectivity issues, screen-related discomfort, device reliability, limited opportunities for interactive learning, and digital distractions, affect students' engagement in digital learning environments. Importantly, these challenges interact with students' visual, auditory, and kinesthetic learning preferences, shaping how they access and process digital reading materials.

By examining these challenges through the lens of learning styles, this study contributes to the literature on digital learning by advancing understanding of learner diversity in technology-mediated educational environments. While many previous studies have examined technological barriers in online learning, the present study highlights how these challenges are experienced differently depending on students' learning preferences, particularly in English reading classrooms within Indonesian higher education contexts.

From a theoretical perspective, the findings reinforce the importance of considering learner diversity when designing digital learning environments. From a practical perspective, educators are encouraged to develop more inclusive and multimodal instructional strategies that combine visual resources, audio explanations, and interactive learning activities to support students with diverse learning styles. Such strategies may help improve student engagement and learning effectiveness in digital reading classrooms.

Despite these contributions, this study has several limitations. The research was conducted within a limited number of participants in a specific higher education context, which may affect the generalizability of the findings. Future research could explore similar challenges in different educational contexts, investigate larger and more diverse student populations, or examine how emerging digital learning technologies can better support diverse learning preferences.

This study highlights the importance of designing digital learning environments that are responsive to the diversity of learners. By recognizing the interaction between technological challenges and learning styles, educators and institutions can develop more effective and inclusive digital learning practices

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

INFORMED CONSENT STATEMENT

Participation in this study was voluntary. Prior to participation, all participants were provided with clear information regarding the study's objectives, procedures, potential risks, and anticipated benefits. Participants were assured of the confidentiality of their personal information and informed that all data collected would be used solely for research purposes. They were also informed of their right to withdraw from the study at any time without penalty. Informed consent was obtained from all participants prior to data collection.

DATA AVAILABILITY STATEMENT

The data generated and analyzed in this study are not publicly available because they contain information that could compromise participant privacy and confidentiality. Restricting public access ensures compliance with ethical research principles and applicable data protection regulations. Nevertheless, the dataset may be made available to qualified researchers upon reasonable request for verification or further analysis. Any such request will be reviewed on a case-by-case basis and will require prior approval from the appropriate institutional ethics authority.

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