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Digital Literacy in English Language Learning: A Mixed-Method Study of Indonesian Senior High School Students

Rohadatul Aisy[1], Fauziah Fauziah[1], Novita Diana[1]

English Education Study Program, Faculty of Teacher Training and Education, Universitas Jabal Ghafur, Sigli, Aceh, Indonesia[1]

Email: aisyr0971@gmail.com

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Abstract.
Digital literacy has become an essential competence in English language learning in the era of rapid technological development, as it influences how students access, evaluate, and utilize digital resources for learning. However, limited attention has been given to how senior high school students experience digital literacy specifically in English language learning within the Indonesian context. Therefore, this study aims to investigate senior high school students' digital literacy in learning English by focusing on their perceptions, application of digital tools, challenges encountered, and strategies used in the learning process. This study employed a mixed-methods design involving 38 eleventh-grade students from SMA Sukma Bangsa Pidie who completed a questionnaire, while six students participated in semi-structured interviews. The instruments used were questionnaires and interview guidelines. Quantitative data were analyzed using descriptive statistics, while qualitative data were analyzed through thematic analysis to identify key patterns and provide deeper interpretation. The findings show that students demonstrate a high level of digital literacy in English learning across technical, cognitive, and socio-emotional dimensions. Among these, socio-emotional literacy emerges as the most dominant aspect, indicating students' strong awareness of ethical behavior and responsible use of digital technology. Nevertheless, students still face several challenges, including difficulties in understanding English materials, information overload, evaluating the credibility of online sources, unstable internet connection, and learning distractions. To address these challenges, students apply various strategies such as seeking help from teachers and peers, using digital learning platforms and artificial intelligence tools, cross-checking information from multiple sources, and practicing self-regulated learning. The study concludes that digital literacy plays a crucial role in supporting English language learning and promoting learner autonomy. It contributes to a clearer understanding of how digital literacy is manifested in EFL classrooms and emphasizes the importance of teacher and institutional support in guiding students toward more critical and responsible digital engagement.

Keywords: *Digital literacy; English language learning; senior high school students; digital technology*

INTRODUCTION

The rapid development of digital technology has changed educational practices in many countries, including English language learning. In recent years, the use of digital tools in education has increased significantly, requiring both teachers and students to adapt to technology-supported learning environments. As a result, digital literacy has become an

important competence for learners in the twenty-first century. UNESCO (2018) defines digital literacy as the knowledge, skills, and attitudes needed to access, manage, evaluate, create, and communicate information effectively through digital technologies. In a similar view, Ng (2012) describes digital literacy as a multidimensional concept that includes technical, cognitive, and socio-emotional competencies that support effective participation in digital environments.

In English language learning, digital literacy allows students to access authentic learning materials through various digital platforms, such as educational websites, online dictionaries, language learning applications, podcasts, videos, social media, and artificial intelligence (AI)-based tools. These resources can support learner autonomy, communication, collaboration, and critical thinking, while also giving students opportunities to practice English outside the classroom. Falloon (2020) stated that digital competence is not limited to technical ability, but also involves critical, creative, and responsible use of digital technologies. Recent studies also show that digital literacy contributes to student engagement and participation in digitally mediated EFL learning environments (Mahmud et al., 2025).

Although digital literacy is increasingly important, students' competencies in using digital technologies are still varied. Many students use digital tools for academic purposes, but they often face difficulties in evaluating the credibility of information, selecting appropriate learning resources, and managing the large amount of information available online. Zhao et al. (2021) emphasized that digital competence requires learners to critically evaluate information and solve problems in digital settings. In addition, the growing amount of digital content and AI-generated information makes critical evaluation even more necessary, because students need to distinguish reliable sources from misinformation and irrelevant materials. Recent discussions on digital literacy also highlight the importance of responsible and critical engagement with emerging technologies, including generative artificial intelligence.

Several studies have examined digital literacy in English language learning. Agusprayuningtyas and Iskandar (2022) reported that digital literacy elements had not been fully integrated into English instructional materials for Indonesian senior high schools. Fauziah and Diana (2023) found that students actively used digital platforms and language learning applications to support self-regulated English learning. Similarly, Soyoof et al. (2023) highlighted the role of Informal Digital Learning of English (IDLE) in supporting language learning beyond formal classroom settings. In addition, Kasriyati et al. (2024) found that senior high school students generally had positive perceptions of digital technology, although their digital literacy skills still needed improvement.

More recently, the use of generative artificial intelligence has created new opportunities and challenges in English language learning. Students increasingly use AI-based tools such as ChatGPT, Grammarly, and other digital assistants to support language learning, receive instant feedback, and access learning resources more efficiently. However, the use of AI also requires stronger digital literacy, especially in terms of checking information accuracy, using technology ethically, and responding critically to AI-generated content. Therefore, digital literacy is not only related to access and use of technology, but also to the ability to use it wisely and responsibly in learning.

Although previous studies have shown the importance of digital literacy in language education, most of them have focused on technology use, informal digital learning, or higher education contexts. Fewer studies have examined senior high school students' digital literacy in a more comprehensive way, especially in terms of technical, cognitive, and socio-emotional dimensions. In addition, limited research has explored how students perceive and apply digital literacy, the challenges they face, and the strategies they use in English language learning. This gap is still visible in Indonesian secondary school contexts, where digital literacy is increasingly needed to support effective and responsible English learning.

Therefore, this study aims to investigate senior high school students' digital literacy in learning English by examining their perceptions and applications of digital literacy, as well as identifying

the challenges they encounter and the strategies they use when utilizing digital technologies for English language learning. The findings are expected to contribute to the development of digital literacy pedagogy and provide useful insights for English teachers, schools, and policymakers in promoting effective, critical, and responsible technology integration in English language education.

LITERATURE REVIEW

English Speaking Ability

Digital literacy has become an essential competence in contemporary education, particularly in English language learning, due to the increasing integration of digital technologies in instructional practices. Learners are required not only to access information but also to critically evaluate, interpret, and effectively utilize digital resources. Ng (2012) conceptualizes digital literacy as a multidimensional construct consisting of technical, cognitive, and socio-emotional dimensions. Technical literacy refers to operational skills in using digital devices and applications, cognitive literacy involves searching, evaluating, and synthesizing information, while socio-emotional literacy emphasizes ethical and responsible participation in digital environments. These dimensions collectively underpin meaningful engagement with digital learning resources.

In English language learning contexts, digital literacy facilitates access to authentic language input through various digital platforms, including online dictionaries, educational websites, social media, podcasts, videos, and language learning applications. These resources support learner autonomy by enabling students to take responsibility for their own learning processes. In addition, digital technologies extend learning beyond classroom boundaries, fostering communication and interaction in English, which is essential for developing communicative competence in the twenty-first century.

From a theoretical perspective, digital literacy is not limited to technical skills but involves critical engagement with digital content. Hafner and Miller (2021) argue that digital literacy in language learning includes the ability to interpret and evaluate multimodal texts in digital

environments. Similarly, Pangrazio, Godhe, and Ledesma (2020) conceptualize digital literacy as a socially situated practice in which learners actively participate in digital cultures while critically engaging with online information. Sälzer and Britt (2021) further emphasize the importance of critical evaluation skills in distinguishing credible and non-credible information in digital environments. In addition, UNESCO (2023) reports that although digital transformation has significantly influenced global education systems, disparities in digital access and literacy skills remain a major challenge, particularly in developing countries.

Empirical studies further support the relevance of digital literacy in English language learning. Agusprayuningtyas and Iskandar (2022) found that digital literacy components are not yet fully integrated into English instructional materials in Indonesian senior high schools. Fauziah and Diana (2023) reported that students actively utilize digital platforms such as social media and language learning applications to support self-regulated English learning and enhance motivation. Soyoof et al. (2023) introduced Informal Digital Learning of English (IDLE), highlighting learners' engagement in English learning beyond formal classroom settings through digital environments. Furthermore, Kasriyati et al. (2024) found that although senior high school students generally have positive perceptions toward digital technology, their digital literacy skills still require improvement, particularly in critical evaluation and effective use of information.

However, despite the growing body of research on digital literacy in English language learning, several important gaps remain. Most studies have focused on higher education contexts or general technology use, with limited attention to a comprehensive framework that integrates technical, cognitive, and socio-emotional dimensions. This indicates that digital literacy is often examined in a fragmented rather than holistic manner.

In addition, empirical studies on senior high school students in the Indonesian context remain limited. Existing research tends to describe students' use of digital tools without deeply investigating how they perceive, apply, and critically engage with digital resources in English learning. Moreover, previous studies have largely emphasized the positive impacts of digital technology, such as increased motivation and accessibility, while less attention has been given to the challenges students face in evaluating information credibility and managing independent digital learning. Students' strategies for overcoming these challenges also remain underexplored.

Therefore, there is a need for a more comprehensive study that examines senior high school students' digital literacy in English learning by integrating technical, cognitive, and socio-emotional dimensions, while also exploring their perceptions, application, challenges, and strategies in real learning contexts. The findings are expected to contribute to the development of digital literacy pedagogy and provide practical insights for teachers, schools, and policymakers in strengthening the integration of digital literacy in English language education.

METHODOLOGY

This study employed a mixed-method research design to explore senior high school students' digital literacy in learning English. The mixed-method approach was chosen to obtain both quantitative and qualitative data, providing a more comprehensive understanding of students' perceptions, experiences, challenges, and strategies in utilizing digital technology for English language learning.

The participants of this study were 38 eleventh-grade students of SMA Sukma Bangsa Pidie who completed a close-ended questionnaire. In addition, six students were purposively selected to participate in semi-structured interviews based on their willingness and ability to provide in-depth information regarding their digital literacy experiences in English learning. Two research instruments were employed to collect the data. The first instrument was a close-ended questionnaire adapted from the digital literacy framework proposed by Ng (2012), consisting of items measuring the technical, cognitive, and socio-emotional dimensions of digital literacy using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The second instrument was a semi-structured interview designed to explore students' perceptions, challenges, and strategies in utilizing digital technology for English language learning.

The data collection process was conducted in two stages. First, questionnaires were distributed to all participants to obtain quantitative data regarding their digital literacy practices. Subsequently, semi-structured interviews were conducted with selected participants to gain deeper insights into their experiences and perspectives.

The quantitative data were analyzed using descriptive statistics, including frequencies, percentages, and mean scores, to identify students' levels of digital literacy. Meanwhile, the qualitative data obtained from the interviews were analyzed using thematic analysis following Braun and Clarke (2006), involving data familiarization, coding, theme development, theme review, and interpretation. The integration of both quantitative and qualitative findings enabled the researcher to provide a comprehensive description of senior high school students' digital literacy in learning English.

FINDINGS AND DISCUSSION

Students' Perceptions and Application of Digital Literacy in English Learning

The questionnaire results indicate that senior high school students demonstrated a high level of digital literacy in learning English across the technical, cognitive, and socio-emotional dimensions. Among these dimensions, socio-emotional literacy obtained the highest mean score (M = 4.18), followed by technical literacy (M = 4.08) and cognitive literacy (M = 3.97). These findings suggest that students possess positive perceptions toward the use of digital technology in English language learning.

Table 1. Digital Literacy Dimensions

Dimension	Mean	Category
Technical Literacy	4.08	High
Cognitive Literacy	3.97	High
Socio-emotional Literacy	4.18	High

From the technical perspective, students were familiar with using smartphones, laptops, and various digital applications to support English learning. Most participants reported that they could easily search for English learning materials, operate online learning platforms, and use language learning applications effectively. This finding indicates that digital technology has become an integral part of students' learning activities.

Regarding cognitive literacy, students demonstrated the ability to search for, select, and utilize digital information relevant to their learning needs. They perceived that digital resources helped them understand English materials more effectively because of the variety of learning content available online. However, some students still experienced difficulties in combining information from multiple digital sources, indicating that information synthesis remains an area requiring further development.

The socio-emotional dimension showed the strongest performance among participants. Students demonstrated awareness of ethical digital behavior, including responsible internet use, polite online communication, and avoidance of plagiarism. In addition, they perceived digital technology as an enjoyable and motivating medium for learning English.

These findings support Ng's (2012) framework, which emphasizes that digital literacy consists of technical, cognitive, and socio-emotional competencies that work together to facilitate meaningful learning experiences. The results also indicate that digital literacy has become an important component of English language learning among senior high school students.

Challenges and Strategies in Developing Digital Literacy

Although students demonstrated positive perceptions of digital literacy, the interview findings revealed several challenges encountered during English learning through digital technologies. Language-related difficulties, particularly vocabulary acquisition, grammar comprehension, listening activities, and understanding digital explanations, remained common obstacles. Students also experienced difficulties evaluating information credibility, dealing with information overload, maintaining concentration while learning online, and accessing premium learning resources or stable internet connections.

Table 2. Challenges and Strategies in Developing Digital Literacy

Challenges	Strategies
Vocabulary and grammar difficulties	Seeking help from teachers and peers
Difficulty evaluating information credibility	Verifying information from multiple sources
Information overload	Selecting relevant learning resources
Internet connectivity problems	Using alternative learning resources
Learning distractions	Applying self-regulated learning strategies
Limited access to premium resources	Utilizing free digital platforms and AI tools

To address these challenges, students employed several adaptive strategies. They frequently sought assistance from teachers, classmates, and family members when encountering learning difficulties. In addition, participants actively utilized digital resources such as search engines, educational applications, social media platforms, YouTube videos, and artificial intelligence tools to obtain additional explanations and learning materials.

Students also demonstrated information verification strategies by comparing multiple sources and confirming information with teachers before accepting it as accurate. Furthermore, they applied self-regulated learning strategies, including note-taking, vocabulary practice, repeated

reading, goal setting, time management, and controlling smartphone usage to minimize distractions during learning activities.

These findings suggest that digital literacy is not merely related to students' ability to operate technology but also involves critical thinking, information evaluation, and self-regulation skills. Therefore, teachers and schools should provide continuous guidance to strengthen students' critical digital literacy and promote responsible technology use in English language learning.

The findings of this study demonstrate that digital literacy plays a significant role in supporting English language learning, extending beyond technical competence to encompass learners' capacity for autonomous learning. Students with higher levels of digital literacy are more likely to engage in self-directed learning by accessing supplementary digital resources such as instructional videos, online articles, and learning applications, thereby enhancing their overall engagement in English learning activities

CONCLUSION

This study investigated senior high school students' digital literacy in English language learning by examining their perceptions, applications, challenges, and strategies in using digital technologies. The findings revealed that students demonstrated a generally high level of digital literacy across technical, cognitive, and socio-emotional dimensions, with socio-emotional literacy emerging as the strongest dimension. This indicates that students were not only capable of using digital tools for learning but also showed awareness of ethical, responsible, and appropriate participation in digital environments. Digital technologies were also found to support English learning by expanding access to learning resources, facilitating independent learning, and enabling students to engage with a wider range of language-learning materials.

However, students continued to face several challenges, including difficulties in vocabulary and grammar, evaluating information credibility, managing information overload, maintaining concentration, dealing with internet connectivity, and accessing learning resources. In response, they employed adaptive strategies such as seeking support from teachers and peers, cross-checking information from multiple sources, using digital applications and AI-based tools, and applying self-regulated learning strategies.

Overall, the study confirms that digital literacy in English language learning extends beyond technical proficiency and involves critical evaluation, responsible participation, and self-regulated learning. These findings highlight the importance of integrating digital literacy more systematically into English language instruction, particularly by strengthening students' critical information evaluation, responsible use of emerging technologies, and independent learning practices. Future studies may involve larger and more diverse samples and examine how digital literacy develops across different educational contexts and levels.

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