The digital reading literacy of Indonesian pre-service English teachers: What do lecturers say?

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Abstract: This study investigates the digital reading literacy of pre-service English teachers from the perspectives of their educators in teacher training institutions. By exploring how educators perceive, assess, and address the digital reading skills of future English teachers, this research aims to shed light on the challenges and opportunities present in developing this particular literacy. Data were collected through deep interviews and questionnaires distributed to five educators of an English education program from a school of teacher training in Indonesia. The data were analyzed using thematic analysis. Findings reveal four main themes; Digital reading literacy of pre-service English teachers; Integration of technology into teaching and learning context; Challenges in developing digital reading literacy; and Institutional and curriculum support. Then, it is found that while digital reading literacy is increasingly recognized as essential for future English teachers, significant gaps remain in terms of increasing pre-service English teachers' motivation and autonomous learning capacity and integrating digital reading skills into the curriculum and classroom practices. The study concludes with recommendations for enhancing digital reading literacy instruction in the classrooms and supporting educators in adopting strategies to improve students' digital reading literacy through providing sufficient training and embedding this literacy into the curriculum.

Keywords: Digital reading literacy, educators, pre-service English teachers

Abstrak: Penelitian ini bertujuan untuk menginvestigasi literasi membaca digital mahasiswa calon guru Bahasa Inggris dari perspektif para pendidik mereka. Dengan mengetahui bagaimana para pendidik memandang, menilai, dan menangani keterampilan membaca digital calon guru Bahasa Inggris, penelitian ini mengungkap tantangan dan kesempatan untuk mengembangkan literasi ini. Data dikumpulkan melalui wawancara mendalam dan kuesioner yang didistribusikan kepada lima pendidik program pendidikan Bahasa Inggris dari sebuah sekolah pendidikan keguruan di Indonesia. Analisis data dilakukan dengan menggunakan analisis tematik. Temuan penelitian menunjukkan empat tema utama: Literasi membaca digital mahasiswa calon guru Bahasa Inggris; Integrasi teknologi dalam konteks pengajaran dan pembelajaran; tantangan dalam mengembangkan literasi membaca digital; Dukungan institusi dan kurikulum. Hasil analisis tematik memberikan informasi bahwa meskipun literasi membaca digital diakui sebagai hal yang penting bagi calon guru Bahasa Inggris, masih terdapat kesenjangan dalam hal peningkatan motivasi dan kapasitas kemandirian belajar mahasiswa calon guru, serta dalam pengintegrasian keterampilan membaca digital ke dalam kurikulum dan praktik kelas. Berdasarkan temuan penelitian tersebut, dapat direkomendasi bahwa pengajaran literasi membaca digital di kelas perlu ditingkatkan dan para pendidik perlu didukung melalui pelatihan yang memadai dan pengintegrasian literasi ini ke dalam kurikulum.

Kata kunci: Literasi membaca digital, pendidik, mahasiswa calon guru bahasa Inggris

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INTRODUCTION

Integrating digital literacy into reading literacy has been a significant international goal (Delgado et al., 2018; Reiber-Kuijpers et al., 2021). However, the development of digital reading literacy remains invisible. Specific challenges emerges from various aspects, such as access, infrastructure, and pedagogical practices that are not always supportive for both

both educators and students. In fact, research conducted by Chen et al. (2023), Hartati et al. (2024), and Liao et al. (2024) reveals that the successful implementation of digital literacy education requires a multifaceted factors that includes institutional support, teacher readiness, and innovative pedagogical strategies. As a consequence, the same things should apply for developing digital reading literacy.

According to Nordquist (2019) "digital reading" is "the process of withdrawing information from a text that is on a digital device," such as, e-readers, laptops, tablets, and mobile phones. According to PISA 2018, digital reading literacy is the ability to comprehend, use, assess, consider, and interact with digital texts in order to accomplish objectives, advance knowledge, and engage in society that encompasses individuals' knowledge and skills of basic reading and their higher-level online reading processes (PISA 2018 Assessment and Analytical Framework, 2019). The Framework for Information Literacy for Higher Education explains that digital reading knowledge and skills include multimodal semiotic awareness, basic and critical information skills, and an understanding of linear and deep reading strategies (Association of College and Research Libraries (ACRL), Framework for Information Literacy for Higher Education., 2016). Multimodal semiotic awareness helps readers to understand the value of the information and dialogic nature of scholarship; The basic and critical information skills support students in the knowledge-building activity where information search is a strategic exploration, and where information creation is both a process and a product; finally, understanding linear and deep reading techniques helps readers understand how power is constructed and contextualized in digital reading and frames the reading experience as an inquiry-based study (Lim & Toh, 2020).

These complexities not only reflect a shift in medium but also demand the use of distinct cognitive processes for text processing, which can make digital reading particularly challenging (Pratiwi et al., 2024; Salmerón et al., 2024; Singer & Alexander, 2017). Hence, reading apps (like iBooks on the iPad) may act as a mediator in the process and reading multimodal digital texts, which include embedded images, videos, and other media elements with language, is a common practice in digital reading (Buccelati, 2008). Website articles, social media posts, and e-books are examples of these multimodal digital texts. Based on the previous theories and definitions of Digital Reading Literacy (DRL) explained above, this research defines DRL as the ability to effectively engage with and critically evaluate information presented in digital formats utilizing various types of digital reading platforms and tools.

In a study on reading in higher education, Pecorari et al., (2012) discovered that students thought reading, whether it be digitally or in print, was not very important. Other studies have also reported several difficulties faced by some tertiary students in engaging with digital reading strategies such as using annotation tools for collaborative and deep reading, making connections from one digital text to another using keyword searches, deploying critical reading strategies such as evaluation and analysis, and evaluating digital texts for their reliability by comparing and finding contradictions in the texts (Seatter, 2019; Park & Kim, 2016; Manarin et al., 2015; Baildon & Baildon, 2012). To add more, the increasing frequency of using mobile devices, such as smartphones, for reading amongst students has also created new reading behaviors such as browsing and scanning, more selective reading, less in-depth reading, and lower reading concentration (Z. Liu & Huang, 2016). Further, evidence suggests that although students are familiar with digital tools, they

often lack the necessary skills for effective digital reading, which requires specific training and practice (Gatto, 2021; Støle, 2018) and massive exposure to leisure media use does not naturally foster the development of digital reading skills, such as the ability to critically evaluate digital texts (Bennett et al., 2008).

Recognizing the challenges of digital reading, particularly in academic context, study on university students highlighted that digital reading skills must be consciously developed, as reliance on technology does not equate to proficiency (Gatto, 2021). Students need to receive comprehensive support and direction in their digital reading. It is because when they are lack the awareness, knowledge, and abilities to execute effective digital reading they will become reluctance to read and the motivation will get deprived. At this point, reading instructions become very crucial to be taught and educators should not simply assume that students have already the reading skills, particularly in digital reading (Fisher et al., 2011). Explicit instruction and modeling for practices can help students improve their reading and digital comprehension and it will also help students be independent learners(Brun-Mercer, 2019). Therefore, incorporating digital reading literacy into English teacher education programs is essential for pre service English teachers not only to facilitate their personal learning process but also to prepare them facing the challenges of contemporary digital teaching and learning once they start their professional journey as teachers.

The purpose of this study is to explore how Indonesian educators view the digital reading literacy of pre-service English teachers and the support of the institution for the development of this literacy. Drawing on meta-analysis of qualitative data and supported by relevant literature (Singer & Alexander, 2017; Brun-Mercer, 2019), Despite the increasing emphasis on digital reading literacy within education, there remains a significant gap concerning the perspectives of educators on promoting digital reading literacy among pre-service English teachers. Most existing literature primarily focuses on pre-service English teachers' outcomes and competencies, often neglecting the insights and experiences of educators responsible for delivering this instruction. Therefore, this study is being carried out to answer two main research questions, how do educators perceive the current levels of digital reading literacy among pre-service English teachers? And what are the implications for English education programs?.

METHOD

This study employs a qualitative research design, particularly a phenomenology approach. This approach is suitable to investigate the perspectives and experiences of educators in applying digital reading in their classrooms and how their students perceive it. Phenomenology refers to a research methodology to gain the information about a particular experience or phenomenon as it is experienced by individuals (Groenewald, 2004).

The phenomenology approach allows the researcher to have a deep understanding of the educators' subjective insight, viewpoints, and lived experiences related to how they observed their students digital reading capacity, the utilization of the digital reading tools and the support provided by the institution. This approach opens wide exploration of the unique challenges, expectations, and perceptions of the participants, providing precious understanding about their experiences within their educational and technological context as educators.

The participants of this study are all lecturers, in this study called as educators, who have been teaching for more than five years in English education programs and in other non- educational institutions. Hence, it can be assumed that they have sufficient experiences and background knowledge of teaching to make valuable judgement towards the digital reading capacity of their students, how they integrate the digital reading activities and tools into the learning process and their personal expectations regarding students' digital reading literacy.

The data were gained through open ended questionnaire and semi- structured interview. The questionnaire were administered by ten educators while the semi-structured interviews were conducted to five representatives of the participants. The collected interview data were systematically coded and analyzed using thematic analysis, using the framework developed by Braun & Clarke (2006). Thematic analysis is a rigorous method for identifying, analyzing, and reporting patterns (themes) within qualitative data. It consists of six steps; first, the interview transcripts were read repeatedly to ensure familiarity with the content. Then, the initial codes were generated to capture key features of the data, namely themes, related to digital reading literacy. The themes are then reviewed to ensure that they are coherent and adequately represent the data. These themes are reviewed and refined to ensure alignment with the research objectives. Finally, the results of the analysis are used to answer the research questions. The data from the open-ended questionnaire were then combined to support and strengthen the findings. Ten main identical questions were formulated in both the questionnaire and the interview. They are; (1) how they define digital reading literacy; (2) their understanding of the competencies required by their students to support their digital reading literacy; (3) the common challenges faced by their students to develop their digital reading literacy; (4) how they describe the digital reading habits of their students; (5) how they perceive their students' ability to evaluate digital texts critically; (6) how they perceive the supports of the institution; (7) Their suggestion to improve the curriculum in supporting the development of digital reading literacy.

The questions in the open-ended questionnaire and semi-structured interview are organized to investigate the experiences, perspectives, and challenges faced by the pre-service English students from their point of view as educators. Both of the instruments allowed the participants to express themselves freely, without being constrained by pre-determined response options. In this study, the questionnaires were distributed first before the interview was conducted to give the participants background knowledge before they attended the interview.

RESULTS AND DISCUSSION

The results display the data regarding the views of educators towards the digital reading literacy of pre-service English teachers and the support of the institution to the development of this type of literacy of the real of digital reading literacy. Based on the result of the meta-analysis, there are four main types of themes: (1) Digital reading literacy of pre-service English teachers; (2) Integration of technology into teaching and learning context; (3) Challenges in developing digital reading literacy; (4) Institutional and curriculum support.

Table 1. Sample of meta-analysis of semi-structured interview and open- ended questionnaire

Themes	Digital Reading Literacy of pre-service English teachers (TI1)	Integration of Technology into teaching and learning context (TI2)	Challenges in Developing Digital Literacy (TI3)	Institutional and curriculum support (TI4)
Sub-themes	Motivation and engagement (ST1))	Tools and resources (STI2))	(IC) (STI3)	Pedagogical approaches (STI4))
Codes	1. Motivation and reading strategies must align with reading activities. 2. Enthusiasm, improving personality, motivation, they must be able to learn independently. 3. Religious values as a source of motivation, understanding life.	1. Google Scholar for scientific articles, mandatory e-books, platforms such as podcasts, and information from the British Council website. 2. Reading e-books, using GCR to share materials, and applications to access audible materials.	1. "Motivation" 2. Strategies and motivation are influenced by surrounding motivation; excessive scrolling on social media makes people increasingly reluctant to read informative materials. 3.Lecturers need to provide a spark, because without it, their critical thinking only emerges slowly. 4. Lack of ability to evaluate critical reading literacy.	(Support from institution) 1. Certainly aligned with the vision, based on EduDigiTech, (refer to the syllabus). 2. It has been implemented, but human resource capacity still needs improvement. 3. Specify digital reading courses with clear procedures, methods, and stages.
	Questionnaire (STQ2)			
Codes	1. Literary works 2. Research paper 3. Essay 4. Goggle Scholar			

		Pedagogical	
		5. Goggle Classroom 6. British Council 7. The guardian 8. Online newspaper	
Sub-themes	**Critical Thinking and Evaluation of pre- service English teachers (STI5)**	**Pedagogical approach (STI6)**	**Educators' roles (STI7)**
Codes	1. There must be specific strategies provided for reading digital texts. 2. Reading and speaking performance, scanning, skimming, for intensive reading, effective reading engage with the text 3. Active readers engage with the text and can answer questions related to the context of the text. Passive readers, on the other hand, only stay on the surface. 4.Autonomous learners Competence can actually be developed with AI, but the most important factor is intrinsic motivation and the willingness to learn as autonomous learners.	1. The development of lesson plans (RPS) should incorporate reading strategies to improve reading interest and enhance their reading strategies (speed and techniques for digital reading). 2. If there is a new course to be taught, it should go through a proper process first. 3. Intensify the dissemination of teaching techniques and content.	Autonomy doesn't just mean giving tasks and stopping; self-directed learners should be guided, present as learning partners, with multiple roles (educator roles).

	(STQ5)	**(STQ6)**

Codes	1. how would you rate the digital reading skills of most of your students (Likert Scale= 5= very good; 4= good; 3= acceptable;2= poor; 1= very poor)
	    4= 2
	    3= 3
	    2= 1
	
	2.how would you rate most of your students' attitudes toward digital reading? (Likert Scale= 5= very good; 4= good; 3= acceptable;2= poor; 1= very poor)
	    4= 1
	    3= 4
	    2= 1
	
	3. how would you describe most of your students' attitudes toward reading as demonstrated in your class?
	  3.1. They need motivation to read them.
	  3.2. Students' attitudes toward reading depend on their background, English proficiency
		1. Did you give Classroom instruction to teach digital reading)
		  No (2)
		  Yes, to some extent (2)
		  Yes, to great extent (2)
		  NO, I have no idea (1)
		  every person has his own style to understand the reading (1)
		
		  (YES)
		2. Applying reading strategies and psycholingustics such as: recognizing words
		3. Teach Academic English, Have Students Summarize What They Read
		4. To master the learning target.

3.3. Most of them are well literate in digital

3.4. it depends on the instruction, they will do it when the task is provided.

3.5. well frankly speaking several of my students feel reluctant when they have to read if I use monomodal text. but if they are given the multimodal text. it would be more challenging

3.6. good

Digital reading literacy of pre-service English teachers

The theme of digital reading literacy of pre-service English teachers is divided into two sub-themes. The first one is related to educators' views on motivation and engagement, while the second one covers the critical thinking and evaluation of pre-service English teachers. From the interviews, the codes imply motivation and autonomy emerge frequently as can be seen below.

Motivation and reading strategies must align with reading activities (V. Female).

Enthusiasm, improving personality, motivation, they must be able to learn independently (K. Female).

Self-awareness about the importance of learning…trying to connect materials with personal goals (A. Female).

Autonomy doesn't just mean giving tasks and stopping; self-directed learners should be guided, and present as learning partners, with multiple roles (educator roles) (N. Female).

The educators emphasize motivation and autonomous learning as the key aspect for developing digital reading literacy of pre-service English teachers and encourage the

students to instill and raise these qualities. The codes imply the critical thinking and evaluation of pre-service English teachers are displayed below.

> There must be specific strategies provided for reading digital texts (V. Female).
> Reading and speaking performance, scanning, skimming, for intensive reading, effective reading, engaging with the text, just like communicating with texts (K. Female).
> Becoming a critical reader doesn't happen instantly, there must be a problem to solve and a connection to phenomena (A. Female)
> Provide tools to accomplish it (N. Female).
> Able to access texts but also use them wisely, with discernment (Vn. Female).

The educators have the same view of how important it is critical thinking and evaluation skills for pre-service English teachers to gain information through the digital world. The terms strategies and tools appear to support the students in building those capacities. In fact, the concept of digital reading literacy extends beyond the ability to read on digital platforms. It encompasses critical thinking, analytical skills, and the effective use of digital tools to access, evaluate, and synthesize information (Lim & Toh, 2020). The questioners' results reveal how educators rate pre-service English teachers' digital reading skills and their attitudes toward digital reading. Among six participants; 2 of them give a 4 score as good; 3 participants give a 3 as acceptable; 1 of them give 2 as poor, towards the digital reading skills of most of their students. The students' attitude towards digital reading is rated as follow; 1 participant give 4 as good; 4 participants give 3 as acceptable; and 1 participant give 2 as poor.

Integration of technology into teaching and learning context

The theme of integration of technology into the teaching and learning context consists of two sub-themes, Tools and resources (Tr) and Pedagogical approach (Pa). The results of the first themes are represented below.

> Google Scholar for scientific articles, mandatory e-books, platforms such as podcasts, and information from the British Council website (V. Female).
> Reading e-books, using GCR to share materials, and applications to access audible materials (Vn. Female).
> Many use digital media, such as the Canva Media Reading application (K. Female).

The data from the questionnaire imply similar results; literary works (2); Research paper (3); Essay (1); Goggle Scholar (3); Goggle Classroom (1); learn English from British council (1); the guardian online newspaper (1). Google Scholar, Canva, and e-books are revealed dominantly from the interview as the integration of digital tools into teaching practices. These tools not only enhance accessibility but also support interactive and multimodal learning experiences, as suggested by Liao et al. (2024). Educators also mention websites (British Council and the Guardian) as part of the digital reading platforms they use

in the classroom. Types of reading texts frequently used in digital reading are literary works, research papers, and essays.

However, effective integration requires educators to adopt innovative pedagogical approaches, such as project-based learning and critical inquiry (Hague & Payton, 2010). Fisher et al. (2011) stress the importance of teaching students to discern details in both digital and printed texts, which educators can achieve through guided practice using diverse digital platforms. The pedagogical approach of those educators can be seen in the codes below.

> The development of lesson plans (RPS) should incorporate reading strategies to improve reading interest and enhance their reading strategies (speed and techniques for digital reading) (V.Female).
> Intensify the dissemination of teaching techniques and content (Vn. Female).
> Specify digital reading courses with clear procedures, methods, and stages (N. Female).

Challenges in developing digital literacy

Low motivation, over-reliance on social media, and limited analytical skills were barriers consistently highlighted by educators. It can be seen below.

> Strategies and motivation are influenced by surrounding motivation, excessive scrolling on social media makes people increasingly reluctant to read informative materials (Vn. Female).
> Children tend to prefer audiovisual content, get bored easily, and only read when given instructions; they are generally more attracted to videos (N. Female).
> Gen Z tends to read in fragments, not entire books; they prefer quick, instant content, and are more interested in book reviews or simply skimming (K. Female).

These challenges are in line with previous research findings. Delgado et al. (2018) found that digital reading often leads to superficial engagement, affecting comprehension negatively. Similarly, Singer and Alexander (2017) point out that students struggle with balancing digital and print reading strategies effectively.

Institutional and curriculum support

The role of institutions in supporting pre-service English teachers' digital reading literacy is pivotal. Through the interview, educators criticized the lack of explicit curriculum and regulation of the institution's emphasize on digital reading literacy and limited professional development opportunities.

> The support has been implemented, but human resource capacity still needs improvement (V. Female).
> Not yet, there are courses to introduce corpus tools, but they haven't been linked to pedagogy (A. Female).
> Not yet, the new curriculum focuses on digital, but the foundation of reading literacy hasn't been strengthened (K. Female).

Intensify the dissemination of teaching techniques and content(Vn. Female).

Providing training for lecturers, and embedding digital reading into courses are the implicit ideas expected by the educators regarding the development of digital reading literacy of pre-service English teachers. They try to say that improving the capacity of digital reading of the lecturers should be the preliminary goal before posing it to the students. Their idea is relevant to the previous researchers, Reiber-Kuijpers et al. (2021) who argue for embedding digital literacy into curricula to prepare students for the demands of a technology-driven world. Professional development initiatives, as discussed by Chen et al. (2023), can equip educators with the knowledge and skills to implement advanced tools and strategies effectively. The integration of multimodal texts and AI technologies, as recommended by Liao et al. (2024), can further enhance institutional support for both educators and students.

The analysis of four main themes; (1) Digital reading literacy of pre-service English teachers; (2) Integration of technology into teaching and learning context; (3) Challenges in developing digital reading literacy; (4) Institutional and curriculum support, reveals the multifaceted nature of digital reading literacy among pre-service English teachers. The results of the analysis apparently answer the research questions on how educators perceive the current levels of digital reading literacy among pre-service English teachers and what the implications of this study are for English education programs.

The educators' views on pre-service English teachers' current level of digital reading literacy

The educators' views on pre-service English teachers' current level of digital reading literacy can be reflected in the analysis of themes 1, 2, and 3. Based on the interview results, educators consistently pointed out the need for active engagement, critical thinking, and autonomous learning to enhance digital reading literacy among pre-service English teachers. However, the predominance of passive reading habits, reliance on social media, and limited analytical skills among pre-service English teachers become significant barriers to achieving this goal. Tools and platforms such as Google Scholar, Canva, and e-books were frequently mentioned as valuable resources for digital reading, though their effectiveness depends on students' intrinsic motivation and educators' ability to integrate them into pedagogical practices.

The challenges faced by pre-service English teachers in developing digital reading literacy reveal broader trends in the education context. Research by Delgado et al. (2018) and Singer & Alexander (2017) confirms that students often show lower comprehension when reading digital texts compared to print, partly due to the limited engagement fostered by digital media. This aligns with educators' observations of students' preference for shorter, less demanding content and their reliance on summarization tools. As the educators mention students' frequent habit of reading WhatsApp statuses or chats that contrast to their enthusiasm in reading more informative texts. Addressing these challenges requires a shift from mere tool usage to cultivating deep reading practices (Wolf & Barzillai, 2009). Educators' roles as facilitators and motivators are crucial in bridging this gap. Providing guided practice and fostering an environment of critical inquiry can significantly improve

students' ability to evaluate and synthesize information from diverse sources (Brun-Mercer, 2019; Fisher et al., 2011). The incorporation of multimodal literacy frameworks, as suggested by Liao et al. (2024), can further support students in navigating the complexities of digital texts, leveraging their visual, auditory, and textual modes for comprehensive understanding

The implication of this study for English education programs

The implication of this study for English education programs is revealed from the theme of institutional and curriculum support. It is found that there is a gap in explicit emphasis on developing digital reading literacy. There is often a lack of in-depth training necessary to prepare educators and students adequately for the improvement of their digital reading literacy. Moreover, the rise of multimodal texts and AI technologies requires adaptive teaching strategies and continuous professional development. These findings resonate with the broader discourse in digital literacy research, which underscores the importance of integrating technology with pedagogy to foster critical engagement (Lim & Toh, 2020; Hague & Payton, 2010). The results of this study call for the urgent need to align curriculum design with the demands of digital literacy. This includes providing professional development opportunities for educators to master innovative tools and pedagogies, as emphasized by Chen et al. (2023) and Reiber-Kuijpers et al. (2021). By embedding digital reading literacy into lecturers' training programs, institutions can prepare future teachers to meet the evolving needs of their students within the digital academic context.

CONCLUSION

The analysis of these patterns; (1) digital reading literacy of pre-service English teachers; (2) integration of technology into teaching and learning context; (3) challenges in developing digital reading literacy; and (4) institutional and curriculum support, provides a holistic understanding of the current state of digital reading literacy in pre-service teacher education. These patterns not only highlight emerging challenges but also point to opportunities for intervention and improvement, aligning with broader trends in educational research and practice. By addressing these patterns systematically, English teacher education programs can better prepare future educators to navigate the demands of the education in digital age.

The synthesis underpins that developing digital reading literacy among pre-service English teachers requires a holistic approach encompassing motivation, critical thinking, and institutional support. While technological tools provide opportunities for engagement, their potential can only be realized through well-structured pedagogy and proactive curricular interventions. The findings not only highlight current challenges but also offer a roadmap for improving a digitally literate generation of educators, aligning with global standards in higher education literacy frameworks like ACRL and PISA (ACRL, 2016; PISA, 2019).

This study explored the perspectives of educators on the digital reading literacy of Indonesian pre-service English teachers. However, there are some limitations that need to be considered. First, the study focused exclusively on educators' viewpoints, that might need insights from pre-service teachers themselves to confirm the existing phenomena. Then, the data were collected from a school of teacher training and education in Jakarta,

which may not fully represent the diverse contexts of teacher education programs across Indonesia. And finally, the study primarily used qualitative methods, although rich in detail, may lack generalizability to larger populations. Building on this study, it is expected that future research could investigate pre-service English teachers' own perceptions and practices related to digital reading literacy, providing a more comprehensive understanding, examine the impact of specific interventions, such as digital reading workshops or training modules, on the digital reading proficiency of pre-service teachers or incorporate mixed-method approaches to offer both breadth and depth in analyzing digital reading practices and outcomes. These roadmap can contribute to a more holistic understanding and improvement of digital reading literacy in teacher education.

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