

Building English Literacy Through MALL and Deep Learning: Challenges and Needs of Elementary School English Teachers

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ABSTRACT

Objective: This study analyzes the challenges and needs of elementary school teachers in the southern coastal areas of Central Java and the Special Region of Yogyakarta in teaching English reading and writing, and identifies the need to develop a digital learning model based on Mobile Assisted Language Learning (MALL) with a deep learning approach. **Method:** This study employed a qualitative case study design to explore the challenges and needs of elementary school English teachers in implementing English reading and writing instruction in coastal communities. The study involved English teachers from Purworejo, Kebumen, and Kulon Progo as participants. Data were collected through questionnaires and semi-structured interviews to obtain an in-depth understanding of teachers' experiences, challenges, and expectations regarding the implementation of a deep learning-based MALL model. **Result:** The results indicate that conventional methods are ineffective in fostering deep understanding and student interest. Key challenges faced by teachers include limited English language proficiency, lack of teaching experience, and minimal training on deep learning approaches. Furthermore, limited lesson time and issues such as student addiction to online games are also obstacles. The needs analysis indicates an urgent need for innovative digital learning models. The majority of teachers believe that MALL can improve students' English literacy and see great potential in an adaptive system that can automatically adjust the difficulty level. Although school infrastructure is considered adequate, teachers still need further training and support for effective implementation. **Novelty:** This study concludes that the deep learning-based MALL model is a relevant solution to address existing challenges, with a focus on meaningful and enjoyable learning experiences.

INTRODUCTION

In today's era of globalization, English language proficiency has become an essential requirement, no longer merely an option (Devi, 2023). Reading and writing skills are the main foundation for mastering English, opening access to various sources of global information and communication. Recognizing this importance, English language learning has been integrated into the Indonesian education curriculum starting in elementary school (Alrajafi, 2021). However, in practice, learning to read and write English at the elementary school level often faces various challenges (Reynolds & Teng, 2021). Conventional teaching methods, such as memorizing vocabulary and grammar, are often ineffective in fostering deep understanding and authentic expression in students (Dewi & Ratnaningsih, 2023; Shofwan et al., 2021). As a result, many students find it difficult, lack motivation, and lack the confidence to use English actively.

The landscape of English language learning in Indonesia has changed over time. In its early days, English instruction at the elementary school level tended to be simple, focusing on introducing basic vocabulary and simple sentences. The material presented was limited, and teaching methods were still dominated by traditional, teacher-centered approaches (Alneyadi et al., 2023; T. Rahayu & Rosa, 2021; Rofi'i & Susilo, 2023). Over

time, awareness of the importance of English has grown, prompting efforts to integrate it more formally into the national curriculum (Pajarwati et al., 2021). However, limited resources, varying teacher qualifications, and a lack of interactive and child-relevant teaching materials remain significant obstacles.

With the rapid advancement of digital technology, Mobile Assisted Language Learning (MALL) has emerged as an innovative solution to address these challenges (Rajendran & Md Yunus, 2021). MALL leverages increasingly common and accessible mobile devices, such as smartphones and tablets, to deliver interactive and flexible learning materials (Jeong, 2022; Karakaya & Bozkurt, 2022). In Indonesia, the use of digital technology in education, including MALL, at the elementary school level, has gradually expanded. Initially, adoption of this technology was limited and met with concerns about teacher readiness, device accessibility, and potential learning disruptions (Hoi & Mu, 2021; Solihin, 2021). However, with widespread internet penetration and increasingly affordable devices, the potential of MALL has begun to be widely recognized. Early initiatives may have been limited to the use of dictionary apps or simple educational games (Ishaq et al., 2021). Now, there is considerable interest in developing more sophisticated MALL apps, offering personalized learning paths, instant feedback, and rich multimedia content (Dong et al., 2022).

However, the use of MALL still requires optimization, especially in the context of developing reading and writing skills. To achieve maximum effectiveness, the integration of learning approach, particularly Deep Learning, is crucial (Agyeman, 2024; Suwandi et al., 2024). In this context, the Indonesian Minister of Primary and Secondary Education, Prof. Dr. Abdul Mu'ti, defined deep learning as a learning approach that focuses on meaningful understanding, mindfulness, and a joyful atmosphere for students (Haditsa et al., 2025; Nur, 2019; C. Rahayu et al., 2025). This approach aims to link learning materials to real-life problem-solving, so that students not only memorize but also understand the concepts behind the knowledge learned (Akmal et al., 2025; Nafi'ah & Faruq, 2025; Wijaya et al., 2025). By integrating deep learning algorithms into the MALL model, we can create an adaptive and personalized learning environment (Kurt DiZbay, 2023). This model is able to provide intelligent feedback on grammatical or spelling errors, recommend reading materials appropriate to the student's ability level, and create dynamic exercises tailored to individual development.

Therefore, this study aims to conduct an in-depth needs analysis regarding the challenges of learning English reading and writing at the elementary school level and to develop a deep learning-based digital learning model (MALL). By examining the real needs of students and teachers, and utilizing the latest technology, this research is expected to produce an innovation that can improve elementary school students' English reading and writing skills in a more effective, engaging, and personalized way, thus preparing them to face future challenges (Indra Kusuma et al., 2021; E. Masykuri, 2023; Sunjayanto Masykuri & Basuki, 2022).

Although English language proficiency is a crucial requirement in the era of globalisation and has been integrated into the Indonesian education curriculum since elementary school, learning to read and write English at this level still faces various challenges. Conventional teaching methods, which focus on memorizing vocabulary and grammar, are often ineffective in fostering deep understanding and authentic expression for students. As a result, many students struggle, lack of motivation, and lack the confidence to use English effectively (Hartono, 2018; E. S. Masykuri & Alekseevna, 2025).

The emergence of Mobile Assisted Language Learning (MALL) as an innovative solution also presents challenges in its implementation especially at the southern coast of Central Java and Special Region of Yogyakarta, such as the effective lesson implied by mobile phone which focuses on namely instructional need, content understanding development, and communication (Azizia et al., 2026; Noor Rohmah & Sulistiawan Aditya, 2020; Sukmawati et al., 2025). Although this technology has become widely adopted, its use still needs to be optimized, particularly in the context of developing reading and writing skills. To achieve maximum effectiveness, the integration of more in-depth learning approaches such as Deep learning is crucial. The aim of this research is to analyze the challenges faced by students and teachers in English reading and writing learning activities and to analyze the needs for developing a MALL based digital learning model with a deep learning approach to improve English reading and writing literacy especially elementary schools in southern coast of Central Java and Special Region of Yogyakarta.

Therefore, an in-depth analysis is needed to identify the challenges faced by students and teachers in learning English reading and writing at the elementary school level. Based on the above problems, this study aims to answer the following questions:

1. What challenges do students and teachers face in learning English reading and writing at elementary school?
2. How is the needs analysis for developing a digital learning model using MALL with a deep learning approach to improve English reading and writing literacy for elementary school students

RESEARCH METHOD

Research Design

This study focused on the case study design and employed qualitative research methods. Qualitative approaches include problem-solving, a comprehensive understanding of the phenomenon, data collection based on words, evaluation of the data for description using text analysis forms, and interpretation of the results with more importance. (Creswell & David Creswell, n.d.; Sugiyono, 2016). According to Creswell, a case study is a type of research in which a program, event, activity, process, or one or more people are honestly examined in order to gain a thorough understanding of the action under investigation.

Data Source

The data were verbal statements and written responses from 14 in-service elementary English teachers in coastal areas of Purworejo (SDN Pagak, SDN Girirejo, SDN Jatimalang, SDN Jatinegoro, SDN Jogoresan, SDN Jogoboyo, MIM Krendetan), Kebumen (SDN Wiromartan, SDN 1 Lembupurwo, SDN Selotumpeng, SDN Tlogopragoto, SDN Mirit, one additional SD), and Kulon Progo (SDN Glagah, SD Muhammadiyah Temon). Participants were purposively selected: currently teaching English, at least one year at the school, and employed in coastal/near-coastal communities to ensure relevance to the study focus.

The semi-structured interview guide and open-ended questionnaire were developed from the study framework, reviewed by two senior ELT researchers and one curriculum specialist, and piloted with two coastal elementary teachers. Following minor revisions, all interviews were conducted by the primary researcher after calibration sessions, audio-recorded with consent, transcribed verbatim, and supplemented by field notes. Multiple

complementary items enabled triangulation, and instrument versions, review notes, pilot data, and transcripts were archived as an audit trail.

Purworejo, Kebumen, and Kulon Progo were chosen for their contiguous southern-coast contexts and documented coastal-specific schooling conditions. Schools were purposively selected to capture variation in status and remoteness; data collection continued until thematic saturation. Participants provided informed consent, anonymity was preserved by coding.

Instrument and Procedure

One of the important aspects of a research was the technique of analyzing data. In order to collect data, there were some instruments that can be used by the researcher. They were test, questionnaire, interview, observation (check-list), and documentation (Arikunto, 2013). Each instruments that were used in collecting data had their strengths and weaknesses. The instruments played an important role in collecting data. In this research, the researcher was the planner, the data collector, the data analyzer, and the data reporter of the research.

The researcher used questionnaire and interview as the instrument of this research. The researchers used a Likert scale questionnaire consisting 10 statements to identify challenges and needs in statements that were in line with the focus of this study. In addition to the questionnaire, the researchers also conducted interviews with teachers to further explore their views on the topic of the research being conducted. There are 4 questions related to the challenges faced by teachers in teaching English reading and writing and 2 questions related to the needs of the teachers if they want to implement a MALL-based deep learning model at the elementary school level.

In order to collect data, the researchers used interviews and questionnaires as the instrument of this research. The interview was used in this research to answer the research questions. The interview provided an opportunity for the researchers to listen, view, or experience the respondents point of view for some time and to ask investigative questions to explore more ideas. The instrument in this study was an interview containing six questions that had to be answered by 14 elementary school English teachers on the coast of Central Java and Yogyakarta, Indonesia. In this study, the interview was conducted offline.

The researcher conducted the interview with the teachers. The interviews were divided into three categories. First, an interview that has a set of questions and all the participants will be asked with the same questions. This interview was called structured interview. Second, an interview that has close-ended questions or it can be called semi-structured interview. This interview questions will be asked based on the context of the participants' responses. Third is natural interview or unstructured interview, it means that the researcher or interviewer makes conversation with the participants with spontaneous questions or general questions based on their situation (Zhang & Wildemuth, 2017). After the participants were interviewed, they would be directed to fill out a questionnaire related to the subject of this research

Data Analysis

After all the data were collected, the data needed to be analyzed. For the interview, the researcher will determine which parts need to be included in the interview transcript. The researcher attempts to identify any of the information gained as the result of the interview by interpreting the narrative summaries of what respondents done. The result

of the interview was analyzed based on what the English teacher at elementary school level said about their challenges and needs in statements that were in line with the focus of this study. The conclusion will be got from the narrative interpretation of the interview transcript. For the data collected by questionnaire, the researchers classified the questionnaire data using a Likert Scale. Based on the respondents' answers, the researchers calculated the number of responses for each option (Strongly Agree, Agree, Disagree, Strongly Disagree) and then presented them in a table. Furthermore, the researchers calculated the mean value of the respondents' answers and categorized them. These questionnaire results were then used as a basis to strengthen the findings obtained from the interviews

RESULTS AND DISCUSSION

Results

In this section, the researchers used a Likert scale questionnaire to identify challenges and needs in statements that were in line with the focus of this study. The researchers will show the results of the questionnaire classification in table 1:

Table 1. Classification of the statements of the challenges and the needs in teaching and developing a digital learning model to improve English language literacy for elementary school students.

Nu	Research Questions	Indicator	Number	SD	D	A	SA
1	Obstacles	1. Students' Difficulty	1, 2	0 21%	6	16 79%	6
		2. Students' Interests	3	2 43%	4	7 57%	1
		3. Effectiveness of Learning Methods	4	0 29%	4	10 71%	0
2	Needs	1. Support or Training	5	0 0%	0	4 100%	10
		2. Teachers' Beliefs about learning models	6, 7	0 0%	0	15 100%	13
		3. Facilities & Infrastructure	8	0 0%	0	5 100%	9
		4. Teacher's Readiness and Confidence Towards earning Model	9, 10	0 0%	0	15 100%	13

The first indicator of the challenges is questioning about teachers' views on students' difficulties in reading and writing in English. The next indicator is questioning teachers' views on students' interest in digital-based learning media. The third indicator is questioning teachers' views on the effectiveness of digital-based learning using MALL.

The first indicator of the needs is questioning about teachers' perspectives on whether they need special support or training in implementing MALL-based learning methods. The second indicator is questioning about how confident and trusting teachers are about the learning model in question. The third indicator is questioning the facilities and infrastructure available at the school. The last indicator asks about how ready and confident teachers are in implementing the MALL-based learning model.

From the table above, the majority of the teachers chose agree rather than disagree for all the indicators. Furthermore it can be concluded that they still find challenges and needs in implementing MALL-based digital learning models to improve English literacy at the elementary school level. In addition, interviews were conducted to find out more deeply the teachers' opinions regarding the challenges and needs in implementing the MALL-based digital learning model. In addition, interviews were conducted to find out more deeply the teachers' opinions regarding the challenges and needs in implementing the MALL-based digital learning model. The findings from the questionnaire and interviews will be presented in more detail in the next section below.

Challenges faced by teachers in teaching English reading and writing in elementary schools

Table 2. Teachers' views on students' difficulties in reading and writing in English.

Nu.	Statement	SD	D	A	SA	Mean	Category
1	Students in your class are having difficulty understanding the meaning of Simple English sentences.	0	4	7	3	2,93	High
2	Students in your class often have difficulty spelling basic English words.	0	2	9	3	3,07	High
		0	6	16	6	3,0	High
			6	22			
			21%	79%			

Note. The frequency for Indicators 1, 2, 4, and 5 represents the combined responses from two questionnaire items completed by 14 teachers (14 × 2 = 28 responses).

The first statement asks about the teachers' views on students' difficulties in understanding the meaning of simple English sentences. Regarding to the answers, 3 teachers strongly agreed with this statement, 7 teachers agreed that students in their class were having difficulty understanding the meaning of simple English sentences. Meanwhile 4 teachers disagreed that their students having difficulty. Based on the result, most of the teachers agreed that their students are having difficulty understanding the meaning of Simple English sentences.

The second statement is questioning about teachers' views on students difficulty when spelling simple English words. 3 teachers strongly agreed with this statement, 9 teachers agreed that students in their class were having difficulty spelling simple English words. Meanwhile 2 teachers disagreed that their students having difficulty spelling simple English words. Based on the questionnaire results, teachers mostly agreed that their students were having difficulties when they spell simple English words.

Table 3. Teachers' views on students' interest in digital-based learning media.

Nu	Statement	SD	D	A	SA	Mean	Category
3	Students in your class show a lack of interest in reading English stories.	2	4	7	1	2,5	High
	Total	2	4	7	1	2,5	High
		6		8			
	%	43%		57%			

The third statement is questioning about teachers' views whether their students having lack interest in reading English stories. There is 1 teacher chose strongly agree for this statement, 7 teachers agreed that students in their class showed a lack of interest in reading English stories. On the other hand 4 teachers disagreed that their students have

a lack of interest in reading English stories. Also, there are 2 teachers who chose strongly disagree for this statement. Based on the questionnaire results, the number of teachers who agree with this statement is greater than the number of teachers who choose to disagree for the statement that their students showed a lack of interest in reading English stories.

Table 4. Teachers' views on the effectiveness of digital-based learning using MALL.

Nu	Statement	SD	D	A	SA	Mean	Category
4	You feel that current teaching methods are not effective in improving students' English writing skills.	0	4	10	0	2,71	High
	Total	0	4	10	0	2,71	High
		4		10			
	%	29%		71%			

The fourth statement is questioning about how the teachers feel that current teaching methods are not effective in improving students' English writing skills. 10 teachers agreed that the current teaching methods are not effective in improving students' writing skills. Meanwhile 4 teachers disagreed that the current teaching methods are not effective in improving students' English writing skills. Based on the questionnaire results, most teacher agreed that their current teaching methods are not effective in improving students' English writing skills.

In addition to the questionnaire, the researchers also conducted interviews with teachers to further explore their views on the topic of the research being conducted. There are 4 questions related to the challenges faced by teachers if they want to implement a MALL-based deep learning model at the elementary school level. The following is a summary of interview answers about the challenges faced by English teachers at the elementary school level:

Limited English Proficiency in Teachers: Many classroom teachers also master other subjects besides English, so they sometimes lack English language skills. This is because English is not a primary subject studied in college.

Lack of "Flying Hours" Teaching English: English learning in some schools only started this year, resulting in a lack of teacher experience in teaching the subject. **Differences in English and Indonesian Reading Styles:** Teachers struggle to explain the differences in English and Indonesian reading styles because students often read English words or sentences using Indonesian reading styles. Teachers sometimes even have to listen to a word being read on YouTube. **Teaching Double-Letter Words:** Teachers face challenges when teaching double-letter words (e.g., "better"), which students sometimes struggle to write correctly.

Lack of Socialization and Training of Deep Learning: Teachers face challenges in implementing the deep learning approach due to the lack of socialization and training regarding the approach, both in teaching methods that are in accordance with deep learning principles and the requirements needed to implement it. **Motivating Students Addicted to Online Games:** Teachers should put more effort into motivating students who are lazy to learn English because they are addicted to playing online games. **Encouraging Students to Listen to English Vocabulary:** The challenge for teachers is to always encourage students to listen to English vocabulary to improve their reading skills, such as good pronunciation and spelling.

Teachers' Pronunciation and Recitation Need to be Trained: Some teachers admit that their English pronunciation and recitation skills still need to be trained. **Lack of Teacher Vocabulary:** Teachers also face challenges in terms of lack of vocabulary, so they have to make more effort to provide appropriate material for students.

Limited English Learning Time: English learning time which is only once a week (two hours) is a challenge for teachers because students are less accustomed to reading and writing English. **Overcoming Class Differences (Multiple Grades):** In some schools, the challenge faced is the use of multigrade classes (several classes in one room), making it difficult to use differentiated learning methods because the lower and upper classes are in one class.

Analysis of the needs to develop a digital learning model using MALL with a deep learning approach to improve English reading and writing literacy for elementary school students.

Table 5. Teachers' needs towards special support or training in implementing MALL-based learning methods.

Nu	Statement	SD	D	A	SA	Mean	Category
5	You need further support or training to integrate digital technology into English reading and writing learning.	0	0	4	10	3,71	Very High
	Total	0	0	4	10	3,71	VeryHigh
		0		14			
	%	0%		100%			

The fifth statement is questioning about the teachers' needs on further support or training to integrate digital technology into English reading and writing learning. 10 teachers strongly agreed that they need support or training to integrate digital technology into English reading and writing learning activities. Also 4 teachers agreed that that they need support or training to integrate digital technology into English reading and writing learning activities. Based on the questionnaire results, most teacher agreed that that they need support or training to integrate digital technology into English reading and writing learning activities.

Table 6. How confident and trusting teachers were about the learning model in question.

Nu	Statement	SD	D	A	SA	Mean	Categor y
6	You believe that the use of the MALL (Mobile Assisted Language Learning) mobile learning application can help improve students' English literacy.	0	0	6	8	3,57	Very High
7	You see the potential in a system that can adapt to the student's difficulty level automatically (the basic principle of Deep Learning) in English learning.	0	0	9	5	3,36	Very High
	Total	0	0	15	13	3,47	Very High
		0		28			
	%	0%		100%			

The sixth statement asks whether the teachers' believe that the use of the mobile learning application can help improve students' English literacy. Regarding to the answers, 8 teachers strongly agreed with this statement, 6 teachers agreed that the use of the mobile learning application can help improve students' English literacy. Based on the result, all of the teachers believed that the use of the MALL (Mobile Assisted Language Learning) mobile learning application can help improve students' English literacy.

The seventh statement is questioning about teachers' views on the potential in a system that can adapt to the student's difficulty level automatically in English learning. 9 teachers strongly agreed with this statement, 5 teachers agreed that the use of the mobile learning application can help improve students' English literacy. Based on the questionnaire results, all of the teachers could see the potential in a system that can adapt to the student's difficulty level automatically (the basic principle of Deep Learning) in English learning.

Table 7. The facilities and infrastructure available at the school.

Nu	Statement	SD	D	A	SA	Mean	Category
8	The school where you teach has adequate infrastructure (e.g., internet access and digital devices) to support digital learning.	0	0	5	9	3,64	Very High
	Total	0	0	5	9	3,64	Very High
	%	0	0		14		
		0%		100%			

The eighth statement is questioning about the schools' adequate infrastructure to support digital learning. 9 teachers strongly agreed with this statement, also 5 teachers agreed that their schools' infrastructure were adequate enough to support digital learning methods. Based on the questionnaire results, all of the teachers agreed that their schools where they are teaching had adequate infrastructure to conduct digital learning method.

Table 8. How ready and confident teachers were in implementing the MALL-based learning model.

Nu	Statement	SD	D	A	SA	Mean	Category
9	You are willing to try a new digital learning model that is specifically developed to develop students' English reading and writing skills.	0	0	6	8	3,57	Very High
10	You believe that a Deep Learning-based digital learning model will be effective in addressing students' English literacy challenges.	0	0	9	5	3,36	Very High
	Total	0	0	15	13	3,47	Very High
	%	0	0		28		
		0%		100%			

The ninth statement asks whether the teachers are willing to try a new digital learning model. Regarding to the answers, 8 teachers strongly agreed with this statement, 6 teachers agreed that they are willing to try a new digital learning model. Based on the result, all of the teachers are willing to try a new digital learning model that is specifically developed to develop students' English reading and writing skills.

The tenth statement is about Deep Learning-based digital learning model will be effective in addressing students' English literacy challenges. 9 teachers strongly agreed with this statement, 5 teachers agreed that the Deep Learning-based digital learning

model will be effective in addressing students' English literacy challenges. Based on the questionnaire results, all of the teachers could see the effectiveness of Deep Learning-based digital learning model in addressing students' English literacy challenges.

In addition to the questionnaire, the researchers also conducted interviews with teachers to further explore their views on the topic of the research being conducted. There are 2 questions related to the needs of the teachers if they want to implement a MALL-based deep learning model at the elementary school level. The researchers summarized the respondents' answers into five categories, namely: the need for a digital learning model based on MALL (Mobile Assisted Language Learning), the need for facilities and infrastructure, the need for teacher training and preparation, the need for learning content/materials, and adjustments to student conditions. Here is the summary:

1) The need for a digital learning model based on MALL (Mobile Assisted Language Learning)

The majority of respondents stated that a digital learning model based on MALL is essential given the current digital era and students' familiarity with gadgets. This model is believed to be more effective in improving students' English reading and writing skills. Digital learning models can also address teacher deficiencies in English language learning. Furthermore, developing this model will encourage students to use their digital devices for positive learning, not just for gaming. Digital game-based learning is essential for students to enjoy learning. Respondents also believed that this learning model allows students to study independently at home using their own devices after being given explanations and guidance in class. This model is necessary to adapt to current developments. It would be great if there were applications that facilitate easy and enjoyable English learning for students. Media or electronic devices that appeal to students are also important.

2) The need for facilities and infrastructure

First, internet access is essential. Some schools already provide internet access, although some have not yet fully reached all locations. Second, mobile or digital devices such as smartphones and laptops are essential. Some schools already have Chromebooks, and school facilities are considered adequate or in need of improvement. Some teachers argue that if mobile devices are limited, students can share one device for use by several students. Delivery media such as projectors (LCD projectors) are needed to guide the use of mobile devices for learning. However, some schools do not yet allow students to bring their own digital devices due to concerns that students will only focus on playing with gadgets. Strict supervision is needed to ensure learning remains conducive and students absorb the learning well, as well as monitoring against negative content.

3) The need for teacher training and preparation

In this regard, teachers need outreach and training on the deep learning approach, as well as the use of the MALL learning model and the necessary media. Furthermore, teachers need to improve their English language skills, particularly pronunciation and writing. Furthermore, teachers need extensive preparation and student conditioning, as well as designing creative and constantly updated learning. Teachers also need to provide direction and motivation to keep students focused on learning.

4) The need for learning content/materials

Applications are needed that facilitate students' learning of English in a simple and enjoyable way. Applications should not be overly complex for students to ensure effective and engaging learning. Teachers also emphasized the need to provide appropriate materials to expand students' vocabulary. Reading books appropriate to students' abilities are also needed to develop English literacy.

5) Adjustments to student conditions

According to the teachers interviewed, whether students will have difficulty depends on the teacher's delivery. Students will not experience difficulties if the learning is engaging and meaningful. English instruction should be gradual and slow, as students' minds tend to go blank when too much information needs to be processed. Furthermore, the implementation of deep learning must be tailored to the students' comprehension capacity. Teachers also need to address the issue of students' lack of concentration and focus in learning.

Overall, the needs analysis indicates that the development of a MALL-based digital learning model with a deep learning approach is urgently needed to improve elementary school students' English reading and writing literacy. However, its implementation requires adequate facilities (internet access and digital devices), comprehensive teacher training, the development of engaging and age-appropriate learning materials, and adaptation of teaching strategies to student conditions and characteristics.

Discussion

This study, which examines challenges and needs for developing digital learning models to improve elementary students' English literacy, confirms several problems reported in the literature: low engagement, limited spelling and sentence comprehension, and the limited effectiveness of conventional teaching methods for reading and writing (Reynolds & Teng, 2021; Shofwan et al., 2021; Sumarni, n.d.; Sutrisna, 2025). Field observations from coastal schools in Purworejo, Kebumen, and Kulon Progo show teachers' and students' expressed interest in Mobile-Assisted Language Learning (MALL) and immersive approaches, consistent with findings that digital media can boost motivation and access (Apriliyani et al., 2025; Jeong, 2022; Karakaya & Bozkurt, 2022; Kartika et al., 2024). Yet the data also reveal persistent constraints i.e. students' difficulties with basic spelling and simple sentence comprehension and a general lack of interest in English stories (Gael & Elmiana, 2021; Hayati, n.d.), which reinforce the need for pedagogical innovation beyond introducing devices or apps alone.

Comparing these field findings to global digital learning models clarifies both alignment and deviation. International MALL and blended-learning frameworks emphasise learner-centred, adaptive, and interaction-rich designs that support personalised pathways and formative feedback (Jeong, 2022; Karakaya & Bozkurt, 2022). In the study sites, teachers believe MALL can improve literacy and report some infrastructural readiness, echoing studies that highlight MALL's potential for flexible, interactive learning (Apriliyani et al., 2025; Jeong, 2022; Karakaya & Bozkurt, 2022; Kartika et al., 2024). However, unlike mature implementations documented in higher-resourced contexts, our coastal settings show limited teacher training in digital pedagogy and deep-learning principles, constrained lesson time, multi-level classrooms, and varying connectivity. These contextual limits mean that directly transplanting high-

resource MALL models is unlikely to achieve the deep, sustained learning outcomes described in the literature.

Integrating deep learning theory sharpens our interpretation. Deep learning emphasises meaningful, attentive, and enjoyable learning that fosters higher-order thinking through contextualized, collaborative, and discovery-based tasks (Bhardwaj et al., 2021; Ferdiansah et al., 2025). Teachers in this study explicitly requested training in deep learning approaches and expressed interest in adaptive systems that respond to students' difficulty levels, evidence of local pedagogical readiness. Nevertheless, the observed lack of socialization and training on deep learning, limited English proficiency among some teachers, and classroom management challenges create barriers to implementing deep-learning-aligned MALL at scale. Thus, while learner interest and some infrastructure are affordances, the systemic supports that global models rely on (robust teacher expertise, curricular time for scaffolded tasks, and adaptive content) are incomplete in these coastal contexts.

Practical implications follow from contrasting field constraints with global recommendations. Studies and local findings indicate three pragmatic priorities: (1) targeted teacher professional development focusing on digital pedagogy, formative assessment, and deep-learning strategies to translate interest into effective practice (Halepoto et al., 2022; T. Rahayu & Rosa, 2021); (2) lightweight adaptation mechanisms (e.g., branching activities, leveled story banks, and rule-based scaffolds) and offline-capable materials when analytics-driven personalization is not feasible (Apriliyani et al., 2025; Kartika et al., 2024); and (3) curricular integration that preserves instructional time for meaningful, multimodal tasks to move beyond surface-level exposure. Teachers' desire to redirect device use from online games to productive learning and their call for specific, practical MALL strategies (Apriani S et al., 2023; Qhoirulita & Fakhrurriana, n.d.) support these priorities.

Design recommendations for an adapted immersive MALL model therefore include pedagogical focus on deep-learning tasks: scaffolded reading-to-write cycles, collaborative storytelling, and metacognitive prompts which combined with technical features that prioritize low-bandwidth media, offline access, and simple adaptive rules. Professionally, sustained, hands-on training and in-class coaching are necessary to build teachers' digital and pedagogical confidence. Empirically, future research should pilot such context-sensitive prototypes and evaluate them using mixed methods and implementation science approaches to measure literacy gains and engagement under real-world constraints.

In sum, this study corroborates global evidence that MALL can enhance motivation and access but shows that successful implementation in coastal Indonesian elementary schools requires contextual adaptation: embedding deep-learning pedagogy, pragmatic technical design, and systematic teacher capacity building rather than direct adoption of high-resource models. Addressing these specific constraints will increase the likelihood that an immersive, MALL-based model produces meaningful, sustained improvements in elementary English literacy.

CONCLUSION

This study concludes that elementary school English teachers in the southern coastal areas of Central Java and the Special Region of Yogyakarta continue to face considerable challenges in teaching English reading and writing. The findings indicate that students

experience difficulties in understanding simple English sentences, spelling basic words, and maintaining interest in reading activities. Teachers also encounter challenges related to limited English proficiency, insufficient teaching experience, lack of training on deep learning approaches, and restricted instructional time.

The findings further reveal a strong need for an innovative digital learning model. Teachers expressed very high confidence in the potential of Mobile Assisted Language Learning (MALL) to improve students' English literacy and positively perceived the use of adaptive learning systems based on deep learning principles. Although schools generally have adequate technological infrastructure, teachers emphasized the need for continuous professional development to effectively integrate digital learning into classroom practice.

This study contributes to the field of English language education by providing empirical evidence of teachers' challenges and needs as the basis for developing a deep learning-based MALL model for elementary school students in coastal communities. The findings offer practical guidance for educators, school leaders, and policymakers in designing technology-enhanced English learning that is meaningful, engaging, and responsive to students' learning needs. Future studies are recommended to develop, implement, and evaluate the effectiveness of the proposed MALL model in improving students' English reading and writing literacy across broader educational contexts.

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