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## Needs Analysis for Developing Augmented Reality-Based Critical Reading Materials for EFL Students

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### Abstract

*English has been a compulsory subject in higher education across Indonesia. However, concerns about students' proficiency remain widespread. Despite the importance of integrating technology into English instruction, especially for enhancing critical reading and thinking skills, many teachers still rely on intuition rather than a systematic needs analysis when developing teaching materials. Consequently, the content often fails to address learners' actual needs or improve language mastery effectively. This study aims to explore the specific needs and challenges EFL students face in developing critical reading skills and their perceptions of augmented reality (AR)-based materials used in such classes. A mixed-methods approach was employed, involving surveys and interviews with 79 purposively selected students from two private universities in West Java, Indonesia. Findings revealed that students commonly use online platforms as sources for critical reading activities. They acknowledged the importance of critical reading and expressed that AR significantly enhanced their engagement and fostered independent learning. Pedagogical advantages of AR-based materials included promoting multisensory learning, improving students' critical literacy and*

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*confidence, increasing enjoyment, and supporting a student-centered approach to technology. Additionally, AR allowed for the integration of virtual and real-world element in meaningful learning environments, which helped reduce cognitive load. The students also recognized AR's role in expanding access to education by making learning experiences more inclusive, engaging, and responsive to diverse learning preferences. Overall, AR-based materials were perceived as a valuable tool to support the development of critical reading skills in English language education.*

**Keywords:** Access to education, augmented reality, critical reading, critical thinking.

## 1. INTRODUCTION

Improving students' critical reading skills is essential in response to changes in reading sources from printed books to screens and changes from traditional print-based media to new information and communication technologies (Javorcikova & Badinská, 2022; Soroya & Ameen, 2020; Sutherland & Incera, 2021). Indonesian students' low mastery of reading skills has been identified as a significant issue, which is reflected in the results of PISA (The Programme for International Student Assessment) 2022, conducted by the Organisation for Economic Cooperation and Development (OECD, 2023), released in December 2023. These findings underscore the urgent need for educational institutions to adapt their pedagogical approaches to address the evolving literacy challenges in the digital age.

Addressing these changes requires appropriate teaching materials to meet the readers' needs and increase their potential and communication actions. Teaching materials for reading courses need to have contemporary, interesting characteristics (Javorcikova & Badinská, 2022). In addition, teaching materials must also be contextualized with the student's conditions under the principles of sociocultural theory proposed by Vygotsky (1978). Through simultaneous analysis and evaluation of critical reading materials, students are expected to succeed academically. Students will also learn to address real-life issues thoughtfully and responsibly, which is in line with the critical thinking principle that emphasizes "the ability to decide what to believe and what to do" (Ennis, 1987, p. 10). This principle aligns with Ozensoy (2021), who showed that explicitly teaching critical reading helps students succeed academically in social science classes. However, critical reading skills in higher education are undervalued in comparison to studies of critical thinking (Din, 2020; Van et al., 2022).

Reading is usually considered a passive skill. However, reading is an active process involving translating information, producing meaning, and analysing various elements of reading material, such as linguistic elements, strategies, and lexical or metalinguistic levels (Gönen & Kızılay, 2022). Critical reading is the implementation of critical thinking in reading activities, and it facilitates readers to think critically, respond to reading material, and determine how someone thinks (Van et al., 2022). Critical reading skills fundamentally influence a person's imaginative, emotional, and moral development. Critical thinking in reading can be implemented through assignments with problem-based activities, enabling students to apply critical reading skills to reading material (Al Roomy, 2022; Yulian, 2021; Yunus & Ubaidillah, 2021).

Over the last decade, various studies have focused on Augmented Reality (AR)-based critical reading education and content production. Jamrus and Razali (2019) demonstrated that technical advancements have allowed a mobile smartphone user to use augmented reality. It demonstrated that adopting AR to teach English, particularly reading, boosted students' reading motivation. Another study found that students who used AR applications outperformed those who read traditionally (Mokmin et al., 2024; Yulian et al., 2022). Students are reported to have positive perceptions of the implementation of AR applications in reading class in the presence of attributes such as technological interactivity, learning environment, compatibility, and cognitive conditions (Fukuda et al., 2024; Jamrus & Razali, 2019; Wulandari & Purnamaningwulan, 2024; Yulian et al., 2022).

In the development of AR-based reading teaching materials, a teacher needs to consider several primary elements, including a psychological foundation, pedagogical foundation, contextual foundation, critical reading foundation, media theory foundation, and technological foundation (Chea & Chaijaroen, 2019). The importance of teaching critical reading using AR stems from its capacity to bridge the gap between traditional literacy abilities and the needs of a fast-changing digital world. AR increases engagement and involvement by offering students immersive, contextualized learning experiences that improve understanding and critical thinking. As media becomes more visual and multimodal, AR enables students to analyse complex, layered texts better, promoting the critical thinking required to navigate misinformation and digital manipulation. Using AR in teaching critical reading, educators may prepare students to be more discerning, flexible, and empowered in a technologically driven society. Therefore, the research questions formulated for this study include:

1. What are the specific needs and challenges faced by tertiary EFL students in developing critical reading skills?
2. How are students' perceptions of Augmented Reality-based materials in a critical reading class?

## 2. LITERATURE REVIEW

Critical reading is an active process in which students analyze texts, evaluate linguistic aspects, and acquire cognitive and metalinguistic awareness (Gönen & Kızılay, 2022; Van et al., 2022). The literature consistently suggests that explicit instruction in critical reading improves academic success (Ozensoy, 2021). However, a noticeable imbalance in research focuses on critical reading in higher education is undervalued compared to extensive studies on critical thinking (Din, 2020; Van et al., 2022). Psychological, pedagogical, contextual, media theory, and technological considerations are fundamental to AR-based teaching materials (Chea & Chaijaroen, 2019), reinforcing that AR is a viable tool for bridging the gap between traditional literacy skills and contemporary digital demands.

### 2.1 The Importance of Needs Analysis for Developing Augmented Reality-Based Critical Reading Materials

Needs analysis is crucial to be conducted before beginning the teaching-learning process, as it provides valuable information about the students' needs (Boakye & Mai, 2016) and identifies their linguistic needs (Richards, 2001). When a teacher identifies students' needs, it might be viewed as learners' lack of linguistic and knowledge. Unfortunately, most English programs do not start with a need analysis to identify students' reading issues before the intervention. Furthermore, the design of teaching English as a foreign language should strike a balance between the target needs of the students and the students' need for scaffolding to provide the best learning environment (Hutchinson & Waters, 1987). Understanding students' issues in a real-time learning environment is also essential in a critical reading class (He & AlSaqqaf, 2025).

In a critical reading class, students need to use high-order thinking skills to comprehend written text (Lijie et al., 2025). Critical reading motivates students to analyze, synthesize, and evaluate the text, predicting the author's intention and improving their comprehension. Critical reading mastery is required to assist students in educational settings (He & AlSaqqaf, 2025). Furthermore, students will have a deeper understanding in reading a text by using critical thinking (Liu & Zhang, 2022). Ali et al. (2022) stated that students lack critical thinking skills because the teaching-learning process in the classroom fails to incorporate student needs analysis, resulting in lessons that are not integrated with students' lives. To solve the problem, a needs analysis is needed to produce responsive instructional interventions, such as augmented reality, to promote students' engagement and comprehension in learning.

Previous research has demonstrated an increasing interest in the convergence of needs analysis and AR-based learning, particularly in tertiary education. Marrahi-Gómez and Belda-

Medina (2022) investigated the implementation of AR in the teaching of English as a foreign language (EFL) classroom, presenting the results of a study on teaching English using AR-based projects published in recent years in WoS and Scopus databases. The technique demonstrated that using AR in EFL instruction enhanced student performance in various areas of study. Such comprehensive reviews validated the potential of AR as a transformative tool that addresses both technological integration and pedagogical effectiveness in modern language learning.

Another study, conducted by Mokmin et al. (2024), found that the use of augmented reality features successfully improves students reading comprehension. In addition, a study found that the use of augmented reality and virtual reality boosts students' confidence (Hung & Yeh, 2023). Moreover, Jamrus and Razali (2019) also showed the improvement of students' learning performance as technology becomes widely used in teaching critical reading. Those studies showed that needs analysis is crucial in developing the approach to teaching reading. The findings align with Hidayat et al. (2025), who found that there is a significant trend in AI research in ELT because it is relevant to the academic community.

## **2.2 Groundbreaking Tool in Critical Reading: Augmented Reality**

Recently, Augmented Reality (AR) has become popular in the teaching and learning process, particularly for critical reading activities. It has become a shifting agent from traditional teaching techniques into more sophisticated approach that immerses students' learning experience into more interactive and interesting activities. AR engages students in a critical reading activity by combining visual, aural, and interactive features, enabling them to achieve better comprehension. Devagiri et al. (2022) and S.-M. Lee et al. (2024) focus on the ability of AR to promote active learning by providing contextualized and multimodal content. They consistently emphasize the ability of AR in scaffolding complicated reading processes such as detecting arguments and analyzing evidence. This is in line with Ebadi and Ashrafabadi's (2022) findings that the scaffolding process is an essential component in the critical process.

AR-based critical reading resources are constructed through a comprehensive, guided need analysis, making them beneficial for the implementation. Singh et al. (2024) provided an example that the implementation of AR should be intuitive and user-friendly, so it can be integrated seamlessly into the teaching of reading. They also suggest adaptive elements such as personalized feedback and customizable difficulty levels so that the students can meet their needs in the learning process. To reach a wide range of students, inclusive designs play a central role in user-centered design (Rahim et al., 2023). To implement technology-based teaching and learning, a pre-implementation assessment is needed to know the students' technology proficiency, cognitive preferences, and accessibility requirements.

## **2.3 Difficulties in Putting AR-Based Critical Reading Resources into Practice**

Using AR in critical reading instruction still leads to some obstacles. The first is related to accessibility and expense. Devagiri et al. (2022) elaborated that the technical limitations in using AR-compatible devices and access to internet connectivity affect the implementation of the learning process. The second obstacle is supporting and training teachers. Due to the technical method in implementing AR in educational settings, teachers should be equipped with technological pedagogical knowledge of AR itself; however, the majority of teachers lack this knowledge. Support and training are needed for the teachers to upgrade their technological knowledge in using AR in the classroom. It is in line with Asadi and Ebadi (2024) who stated that teacher assistance and professional development courses are needed to support the implementation of AR in the classroom. They advocated for institution-wide initiatives to enhance training programs and infrastructure, aiming to address these issues and foster teachers' recognition of their capacity for deep language acquisition, positive sentiments, and a greater desire to utilize AR-based technology. The third obstacle is about the well-being and involvement of the students. The students tend to choose to read printed reading rather than digital reading in

learning English, although AR technology offers an immersive and authentic learning environment (Ghasemi et al., 2022).

Another challenge in implementing AR-based technology in the learning process is about educational objectives. Developing critical reading resources using AR-based technology is crucial for aligning the teaching and learning process with learning outcomes and curriculum objectives. Koumpouros (2024) suggested a cooperative strategy that involves curriculum developers, subject matter experts, and technology to ensure AR aligns with educational objectives. Combining those aspects into the implementation of AR-based technology could balance the standard of academic objectives and higher-order thinking ability.

### 3. METHODS

#### 3.1 Research Method

This study employed a mixed method design, as Creswell (2014) outlined. In a mixed-method study, the researcher uses both qualitative and quantitative data gathering and analysis methodologies in the same study. This study aimed to investigate the specific needs and challenges EFL students face in developing critical reading skills and to determine students' perception of augmented reality-based materials in a critical reading class. To collect the data, the writer acquired both numerical and textual information. In the end, the database contains both quantitative and qualitative information. To address the specific needs and challenges encountered by tertiary EFL students who were mentioned in the preceding section, a quantitative approach was used. While this was going on, the qualitative method was used to determine how AR-based materials met these needs.

#### 3.2 Participants

A total of 79 third-semester students from two private universities in West Java, Indonesia, participated in the research. They all have completed the critical reading course. There were 30 students from a university in the Indramayu district and 49 from Bandung. Of these participants, 60 were females, and 19 were males, aged 19-22. Participants were selected using purposive sampling, a strategy recommended by Patton (2015) for its ability to identify individuals who can provide rich and relevant data.

#### 3.3 Data Collection Procedure

Data collection for this study was done using a mixed-methods approach that included a survey and interviews. A survey was provided to students to acquire quantitative data on their preferences, challenges, and expectations for AR-integrated critical reading tools. Creswell (2014) emphasized several key components when designing a survey. They are purpose and research questions, theoretical framework, survey design, population and sampling, instrumentation (survey items and constructs), data collection, and data analysis. Interviews offered qualitative insights into students' perspectives, highlighting specific needs for integrating AR into reading activities, including interactivity and contextualized learning experiences.

The study employed a quantitative method to answer the first research question, using an online survey via Google Forms. Meanwhile, the study employed a qualitative method to answer the second research question. Semi-structured interviews were performed with ten students from two different universities following the completion of the survey. The researchers sought input from qualified specialists to confirm the validity of the instruments used in this study. Two experts assessed the instruments, specifically the initial needs analysis and program evaluation surveys. They evaluated and provided feedback on the instruments for content, organization, and relevance to ensure alignment with the research questions and study objectives.

### 3.4 Data Analysis Technique

In this research, data analysis is critical in identifying the specific requirements of the learners and designing suitable educational interventions. Thematic analysis, a widely used qualitative method, was employed to process data gathered through interviews. The questionnaire responses were analyzed quantitatively using the percentage formula, whereas the research outcomes were described qualitatively and compared to the results of earlier investigations using thematic analysis. There are six steps in thematic analysis (Creswell, 2014), namely organizing and preparing the data, reading and familiarizing the data, coding the data, identifying and reviewing themes, defining and naming themes, and interpreting and reporting findings. This approach facilitated the identification of key patterns and themes within the dataset, enabling a deeper understanding of students' preferences, challenges, and expectations in adopting AR for critical reading materials. This analysis explored the students' perception of using AR in a critical reading class.

## 4. RESULTS

This section presents the findings from the current study, including the need analysis conducted with students in the critical reading class, which informed their preferences, challenges, and the technology and media they chose in the critical reading class. Following the needs analysis results, students' perception of the use of AR in the critical reading class is presented. The data were analyzed to identify how augmented reality (AR) integration could enhance students' engagement and support the development of their critical reading skills.

### 4.1 Needs Analysis for Developing Augmented Reality-Based Critical Reading Materials for EFL Students

The needs analysis results indicated that tertiary students in Indonesia faced challenges in learning critical reading and identified a need for improvement in this area, as well as in developing productive skills and critical thinking to support learners. In particular, many students reported difficulties in understanding implicit meanings and evaluating authors' arguments critically. As highlighted in the questionnaire, the challenges associated with critical reading are provided in Figure 1.

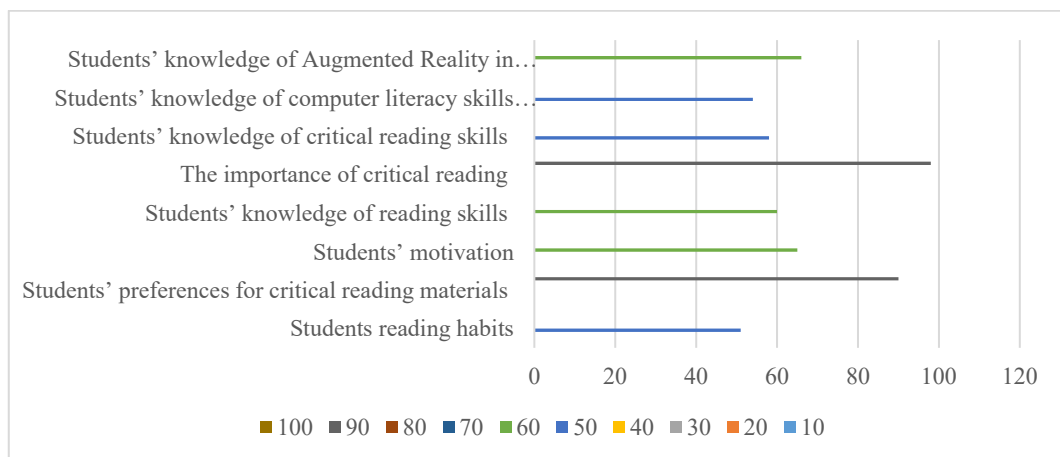


Figure 1. Need analysis result.

From Figure 1, 51% of the participants reported that they read news from online media almost daily. A total of 35% of the participants selected the option that they only read the news when there is an assignment from the lecturer. Regarding students' preferences for critical reading

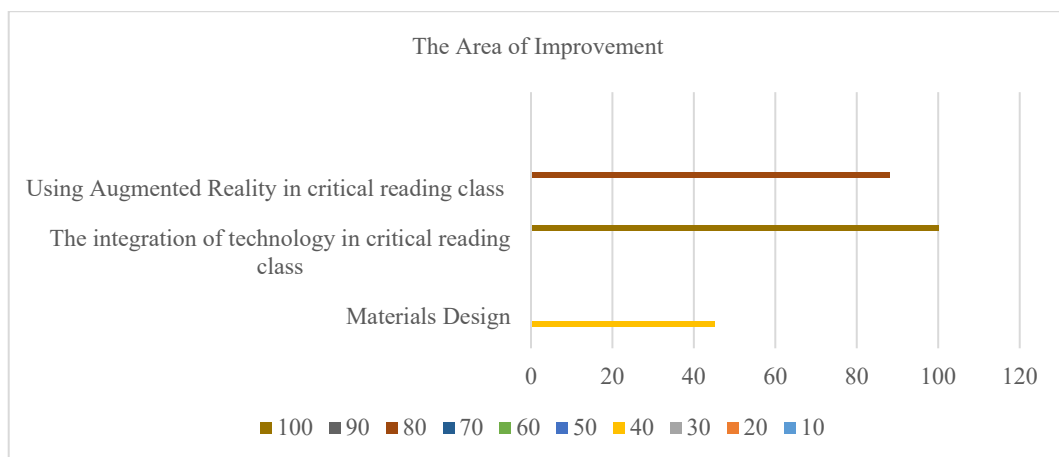
materials, 90% of the participants reported that they chose online rather than printed materials. In addition, 10% of the participants said they decided on both online and printed materials for classroom use. The data showed the lack of student motivation, cited by 65% of the respondents. This finding indicated that the students struggled to engage with the content of critical reading.

Additionally, 25% of students reported needing interesting materials to support their learning activities. Figure 1 also shows that 98% of participants considered reading an important skill. Furthermore, most students (87.34%) believe that distinguishing between fact and opinion is the most crucial skill. The next important skill is determining the main idea, selected by 60 students (75.95%). Developing a strong argument ranks third, with 57 students (72.15%) selecting the option. The ability to understand word choice was selected by 50 students (63.29%), followed by recognizing errors in reading, chosen by 49 students (62.03%). The skill of comparing and contrasting was selected by 45 students (56.96%), while making assumptions was the least popular, with only 34 students (43.04%) selecting this option.

Regarding students' understanding of critical reading concepts, the results show that most students positively perceive this statement, with 46 58% reported that they were familiar with critical reading. Meanwhile, 33 students (41.77%) said they did not understand the concept. Some students might think critical reading is the same as reading in general, such as reading aloud and vocalizing. The students' misunderstanding is further evident in responses that equated critical reading with writing rules, remembering, organizing, self-regulating, and speed reading.

The finding revealed students' confidence levels in their critical literacy skills. Most students were doubtful, with 60% selecting "probably". Meanwhile, 25.93% of students felt confident in their critical literacy skills, and 13.58% students indicated they lacked these skills. In terms of students' confidence in their computer literacy skills, most students have expressed doubt, with 54.43% selecting 'maybe'. In contrast, 37% students felt confident in their computer literacy skills, while 7.60% indicated they lacked these skills. The finding presented students' familiarity with the term 'Augmented Reality'. Most students, 53 (67.09%), reported they had never heard the term 'Augmented Reality', while 26 students (32.91%) stated that they knew the term 'Augmented Reality'. The majority of students found critical reading material using AR engaging, with 54 students (66.67%) describing it as 'interesting' and 23 students (27.38%) as 'very interesting'. Only two students (2.38%) considered it 'normal', and none was indifferent to the presentation format.

The need analysis highlighted several key areas for improvement in teaching critical reading. These include an urgent need to enhance materials and teaching media, as well as a necessity for better integration of technology in critical reading classes. The findings draw attention to the importance of addressing these areas to enhance the overall effectiveness of teaching critical reading.



**Figure 2.** Key areas for improvement in teaching critical reading.

Figure 2 presents students' expectations of various materials to enhance critical thinking. Most students identified digital text as the most effective material in the critical reading class, with 45 (54.22%) selecting this option. Additionally, 26 students (31.33%) chose online discussion, six students (7.23%) selected collaborative document editing, and two students (2.41%) preferred annotation tools. The finding presents students' expectations of technology's role in improving critical reading skills. All students agreed to integrate technology into the critical reading class. Most students sought quick and easy access to information, with 21 out of 78 participants (26.92%) choosing this option. Additionally, 18 students (23.08%) hoped technology would foster their interest in reading, while a total of 15 students (19.23%) believed it could enhance critical reading. A total of 13 students (16.67%) expected technology to improve critical and reflective thinking skills and reduce misinformation (hoax). A total of 5 students (6.41%) did not respond. Only four students (5.13%) believed technology encouraged creativity and innovation, and three students (3.85%) emphasized the importance of technology in developing academic skills for workplace success.

The finding also showed that 88% of the students believed that AR could enhance their critical reading skills. Most respondents identified 3D visualization as the most enjoyable method, with 31 respondents (39.24%) selecting this option. Additionally, a total of 12 respondents (15.19%) believed AR made learning more interactive and engaging. There were 11 respondents (13.92%) who provided non-specific benefits of AR, while 10 respondents (12.66%) viewed AR in e-book format with images as effective. Nine respondents (11.39%) were unfamiliar with AR, and six respondents (7.59%) preferred AR presented as interesting videos.

All participants agreed that technology can improve critical reading abilities. Their responses were insightful and varied. Some students attributed the traits of Gen Z to the TikTok effect, noting that information is often presented with a limited focus and short duration. Others highlighted potential adverse effects, as technology allows access to diverse online reading materials, which can lead to a preference for digital content over hardcopy books. All participants acknowledged the importance of technology; they emphasized the need for technological literacy to be used effectively.

## **4.2 Students' Perception of Augmented Reality-Based Materials in a Critical Reading Class**

### *4.2.1 Students' understanding of the use of technology in improving students' critical reading skills*

Data suggests that technology could help students improve their reading skills. Most participants reported that they spent most of their time in the digital world, indicating that the learning process in class needed to be modified to keep up with current developments. Technology was seen as something that could help students and lecturers make classroom learning more interesting and improve their critical reading and critical thinking. For example, P1 said that the use of technology in everyday life was very important. In line with P1, P2 also emphasized that using technology in learning was essential to motivate students to quickly find up-to-date learning resources that were assessable anytime and from anywhere. Moreover, P3 and P4 explained the importance of technology in critical reading classes, as shown in Excerpts (1) and (2).

- (1) Technology has opened up new opportunities to improve students' critical reading skills. By utilizing the various tools and platforms available, students can learn more independently, effectively, and interestingly. However, it is important to remember that technology is only a tool. Learning critical reading skills still requires practice and guidance from lecturers. (P3)
- (2) Technology has a great potential to improve students' critical reading skills, but it can also be an obstacle if it is not used wisely. Students need to learn to utilize technology as a tool to enhance their learning and develop the skills to evaluate information critically and think independently. (P4)

Furthermore, P5, as presented in Excerpt (3), underscored the effectiveness of technology, stressing its role in facilitating quick and convenient access to information. This indicates that the students' exposure to diverse and credible reading materials are broadened by the technology, but its optimal use still depends on students' critical awareness and instructors' support. This perspective suggests that technology not only broadens students' exposure to diverse and credible reading materials but also supports the study's emphasis on enhancing learning through accessible digital resources.

- (3) I think technology is very effective because it makes it faster and easier for students to find news and information. The positive point of using technology is that students have access to lots of reading and valid sources on the internet. (P5)

#### 4.2.2 *Students' understanding of the use of augmented reality in the critical reading class*

Another research finding that deals with using AR was found in critical reading classes. In this regard, most participants said AR positively motivated students to learn. To exemplify, P6 explained his/her opinion in Excerpt (4). P7 also agreed that AR is very attractive.

- (4) Using AR in a critical reading class is very interesting. It can make lessons that usually use boring text more interesting and easier to understand because it shows you a picture in 3D. So we can get the materials in detail easily. (P6)
- (5) When studying an event, we can see the picture more realistically. This makes us think more critically. Information delivered through an AR scheme is more interesting. Using AR increases the attractiveness of the course itself, rather than just relying on densely written textbooks. For example, when we read about tourist attractions, we can shift the 3D image of tourist attractions and receive information while actively looking at the image. (P7)

P8 provided further explanation. He said that the use of graphics, videos, and 3-dimensional images offers more information for students. He further emphasized that such interactive features in AR help learners understand the context and meaning of the text, thereby deepening their critical reading comprehension.

- (6) AR can improve critical reading skills by presenting additional information and context interactively on top of the text being read, such as graphics, videos, and 3-dimensional images. (P8)

In line with P8, P9 revealed that AR helped her better understand the meaning of the text she read. She explained her experience in Excerpt (7). Her statement indicates that AR not only clarifies complex and abstract ideas but also encourages active engagement and perspective-taking, which are essential components of critical reading.

- (7) Sometimes, when we are confused with the material, AR makes abstract ideas and complex texts easier to understand, engaging students on a deeper level. AR can help us simulate different perspectives from a text so we can understand the text. (P9)

The data shows that AR motivates students, particularly in critical reading, by providing access to diverse digital reading resources and interactive learning platforms. This enables students to deeply understand texts, engage in discussions, and receive real-time feedback, effectively boosting their critical analysis skills. Furthermore, the data showed that AR promotes student engagement and involvement by providing learning experiences that improve comprehension and critical thinking.

## 5. DISCUSSION

The results of the study show that the frequency of reading news among students at two universities in Indonesia varied. The data revealed that most students only read news when they

have lecture assignments. Others said that they rarely read news from print media, and a few of them said they never read news from print media. This result is consistent with that of [Fuad et al. \(2023\)](#), who discovered a decline in Indonesian students' enthusiasm for reading. Because this puts no pressure on students to read extensively, the teacher should identify alternate forms of instruction that can be used to improve the reading literacy of the class.

Additionally, students have indicated that they would utilize social media instead of traditional libraries, which has led to a diminishing trend of traditional library use in universities. The statement aligns with [J. Lee \(2022\)](#), who argued in favor of the advancement and application of narrative-driven, location-based AR games in foreign language education. The findings about students' reading habits revealed that when they came across news, most read the headline and its content. [Pitafai \(2022\)](#) found that students agreed that reading news articles can help them keep informed of updated issues and expand their vocabulary. Additionally, they concurred that news articles were a suitable teaching tool for reading comprehension because they offered engaging and updated content, authentic resources, and the opportunity to foster positive relationships with their English teachers.

Regarding students' preferences for critical reading materials, most students reported that they read the news from online media to get easy access. Only a small percentage of students reported that they hardly ever read news from the internet. The present study's findings align with those of [Baba and Affendi \(2020\)](#), who discovered that students preferred and had easier access to digital materials, compared to the printed counterparts. The results demonstrate that teachers impact students' reading habits and attitudes, so educators should actively encourage students to read. According to [Yu et al. \(2021\)](#), respondents' habits of reading news had shifted to consuming more content on their phones, but in different news categories. The results of this study are in line with [Shane-Simpson et al. \(2018\)](#), [Malekani \(2023\)](#), and [Sivakumar et al. \(2023\)](#), who found that university students use technology in their everyday lives and that they have a positive impact on them because technology provides them with reliable information on their daily activities.

Students have varying levels of confidence and motivation regarding the news. Students can use technology to get access to a wide range of resources from around the world, including articles, videos, blogs, and podcasts. Exposure to multiple points of view helps in critical analysis, comparison, and evaluation of information. This argument is consistent with [Damayanti et al. \(2024\)](#), who discovered that students prefer a modern, adaptable, and participatory approach to learning English. The research also revealed that most students seek confirmation from many sources before accepting information from the media. This finding is attributed to both emotional demands and news interpretations that combine critical and positive perspectives.

Regarding how well students comprehend the idea of critical reading, the majority saw the term critical reading favorably. Conversely, a few students claimed they did not understand the idea of critical reading. The students' responses indicated that they linked reading aloud and critically with the process of reading. This finding is consistent with the findings of [Din \(2020\)](#), who found that while university students had a very positive attitude toward critical thinking, their degree of critical thinking and their capacity to apply critical thinking to their critical reading skills did not match. Based on the findings, most students agreed that critical reading abilities were crucial. In the increasingly contemporary and digitally connected world, critical reading has become essential, along with critical thinking, for university graduates ([Bråten & Braasch, 2017](#)). Additionally, it demonstrated how teaching students a wide range of critical reading skills helped them overcome their reading difficulties since they could read what was written down and what was being said in between and outside of the lines ([Al Roomy, 2022](#)).

Most students believed that the ability to discriminate between truth and opinion was the most important reading skill. Credible news appreciation has the greatest impact on performance. This approach is associated with students' abilities to gather information, evaluate textual materials and images, and verify bogus information on websites disputing climate change ([Nygren & Guath, 2022](#)). Concerning the level of student confidence regarding their computer literacy skills, the findings indicated that familiarity with technology, self-directed learning, and socioeconomic status account for the differences in ICT self-efficacy. Furthermore, a session on students' computer and information literacy requires understanding their gender, self-efficacy,

and socioeconomic background. This suggests that when other student characteristics and contextual variables are considered, ICT self-efficacy is positively correlated with computer and information literacy. The findings show a discernible difference between computer and information literacy and ICT self-efficacy (Hatlevik et al., 2018). The findings are consistent with those of Sart (2023), who found that the majority of students expressed serious concerns about sophisticated technologies and abilities such as coding and AI understanding, and that they were not very skilled in basic digital literacy.

Meanwhile, Şimşek and Direkçi (2023) found that AR could improve students' reading comprehension. The learning instruction that enhanced with technology integration can effectively engage the students in learning process, improve their critical reading and writing skills, and facilitate the application of these skills in academic context (Mali, 2022; Sutrisno, 2022; Yulian, 2021). In order to effectively select, evaluate, analyze, and assess the material they come across in their academic lives, individuals must acquire these skills. However, we also expressed worries about AI's drawbacks, such as its impersonal nature and challenges with subtle comprehension. Additionally, Yu et al. (2021) found that the use of an intelligent AR and VR interactive system met the students' learning needs and improved their ability in English class.

Responding to questions about the use of technology in improving critical reading, all participants responded that technology could enhance critical reading skills. Students provided a variety of responses that were interesting to explore. Many students also connected technology use to potential drawbacks because it allows readers to access reading materials from various internet sources. It makes sense because students now frequently access reading materials online, rather than printed books. Therefore, even though every participant said that technology was vital, making the most of technology effectively requires a grasp of technological literacy. With constant practice, students can develop critical reading skills. Based on the data, half of the respondents had improved their critical reading skills, which, in turn, had increased their enthusiasm for reading (Henry & Mohamad, 2021). Sural (2018) found that teacher candidates were excited to employ augmented reality in their classrooms for the first time. Furthermore, Jensen and Scharff (2019) discovered that students who used e-readers in their reading assignments demonstrated improvements in their attitudes towards the use of e-readers for critical reading practices and a deeper understanding of the texts' content.

Most students believed that technology would make information immediately and easily accessible. Students also believed that technology would increase interest in reading, boost critical reading comprehension, develop analytical and critical thinking abilities, and reduce the incidence of hoaxes. This aligns with King-O'Brien's (2021) assertion that students need to develop their ability to analyze news writing and sources to combat fake news critically. Students' critical thinking ability will help them read the text more proficiently, discuss, and interact with current events and real-world issues with empathy, nuance, and complexity. Students initially had a favorable attitude toward the practicality, use, and behavioral goal of utilizing instructional technology in college settings.

Furthermore, the majority of respondents stated that 3D visualization was the primary way AR could improve critical reading skills. The results demonstrated that AR had a substantial impact on students' critical thinking and visualization skills. Thus, our study indicated how augmented reality technology could help students develop higher-level critical thinking skills (Sulistyanto et al., 2024), visualize abstract concepts, and become better readers (Piriyasurawong, 2020). Saidin et al. (2024) proved that augmented reality could help students develop critical thinking skills by supporting them in visualizing abstract concepts. Students also said that AR made lectures easier, especially critical reading. In addition, the use of technology also increased students' interest in reading. This finding aligns with Şimşek and Direkçi (2023), who found that AR helps students reorganize inferential comprehension, evaluation, and appreciation. In 2020, Ebadi and Ashrafabadi (2022) found that AR increased students' enthusiasm for completing reading comprehension assignments and readiness to use AR-based teaching tactics in EFL classes. Therefore, it can be concluded from the results that using AR in the classroom can significantly raise students' critical thinking abilities. These results suggest that AR is one of the

most significant technological options that can be applied broadly to deliver educational materials to enhance students' critical thinking abilities in the 21st century (Sulistyanto et al., 2024).

One key implication of these findings is the necessity for educators to adopt more dynamic and technology-driven instructional approaches to enhance students' reading literacy and critical reading skills. Given the shift toward digital media and social networks for news consumption, integrating interactive and engaging methods such as AR, Artificial Intelligence (AI), and mobile applications can foster students' motivation to read beyond academic requirements. Furthermore, the decline in traditional library usage underscores the need for institutions to modernize their resources and equip students with the digital literacy skills required to critically analyze online content. Since students realize the significance of critical reading but display various levels of confidence and motivation, instructors must build programs that include both traditional and digital literacy practices.

## 6. CONCLUSION

The study aims to determine students' needs and perceptions of using AR in critical reading classes. EFL students' critical reading abilities fell short of what was required for critical reading in English text instruction and comprehension. To overcome this issue, educators must create a practice tool that leverages technology to improve traditional curricula and meet the different learning needs of their students. The participants were motivated to use AR in the critical reading class. Some of the pedagogical benefits that have been discussed include improving student engagement, encouraging learner autonomy, facilitating multisensory learning, improving spatial ability, confidence, and enjoyment, encouraging student-centered technology, and combining real objects and virtual in an authentic setting. The findings demonstrated that while language skills have received relatively little attention, much focus has been placed on critical reading, critical thinking, learner effectiveness, attitudes, and motivation. Thus, AR is needed to develop students' critical reading. Even though there are several challenges involved in integrating AR into educational practices, the applications offer a valuable tool for improving memory and learning because they offer immersive multimodal environments enhanced by various sensory features.

Follow-up activities should include developing a curriculum and learning media that are easily adaptable to university students in Indonesia. After an AR-based lecture, students can analyze texts by engaging with AR features such as visual annotations, 3D models, or text-related multimedia content. These activities include technology while also reinforcing critical reading abilities. Furthermore, this study only focuses on the need analysis for adopting AR in critical reading sessions. Further research might look into the use of augmented reality at other levels of education, using different materials and with a larger number of participants.

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