

International Journal of Learning, Teaching and Educational Research
 Vol. 25, No. 2, pp. 626-654, February 2026
<https://doi.org/10.26803/ijlter.25.2.28>
 Received Nov 21, 2025; Revised Jan 26, 2026; Accepted Jan 30, 2026

Enhancing Arabic Reading Skills and Competitive Spirit of Prospective Teachers through Smart Learning Environments in Indonesian Islamic Universities

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Abstract. Learning Arabic reading skills has been perceived as passive, monotonous, uncreative, and uncritical. However, learning environment can change learning conditions and perceptions and enable goals. This article discusses smart learning environments in terms of its application in learning Arabic reading skills II (*maharah qiro'ah II*), its contribution in realizing goals, and its role in realizing the competence of prospective Arabic teachers in the Indonesian National Qualifications Framework. This qualitative research used a total sampling technique and followed the learning process for one semester of 19 students in the International Class Program class of the *Maharah Qiro'ah II* course, majoring in Arabic language education, Faculty of Tarbiyah and Teacher Education, UIN Maulana Malik Ibrahim Malang. The national and international achievements of students participating in smart learning environments from 2022–2024 were used as supporting documents. The learning process was observed, and interviews were conducted with 19 students through a Google form link with smart learning environments indicators of “showing”, “manageable”, “accessible”, “real-time interaction”, and “test”. This research applied the Miles and Huberman model for data analysis. The main findings of the research were that technology-based pedagogical integration can produce prospective teachers with successful characteristics. Learning *maharah qiro'ah* by applying a smart learning

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environment can equip students with a spirit of competition that can realize reading skills for prospective Arabic language teachers and national and international achievements.

Keywords: Arabic; Islamic universities; media; reading skill; smart learning environment

1. Introduction

Quality education is an important demand, especially in the rapidly evolving digital era. Traditional learning processes are no longer able fully to meet the needs of students to understand the material effectively and quickly. Arabic is often considered difficult, especially reading skills (*maharah qiro'ah*), due to its complexity. This difficulty arises not only from the need to understand the vocabulary but also from mastering the *syakal* or punctuation marks that greatly affect the meaning of the words (Fihri et al., 2023).

For example, a change in punctuation in a particular word can drastically change the meaning, such as the word "Ahmad," which has different meanings depending on its grammatical function in the sentence (Saeed Al-Sobhi et al., 2017). Putting a *syakal* in the middle of a word relates to mastering the science of morphology (*sharf*), while at the end of the word relates to the science of syntax (*nahwu*), both of which are important foundations in reading Arabic (Ismael & Badie, 2023; Machmudah & Rosyidi, 2020). In addition to mastering linguistic aspects (intra-linguistic), learners must also understand the theme or context of the material being studied (extra-linguistic). Reading skills are not only limited to spelling but also understanding and inferring the content of the text (Alazzam & Alamaren, 2022).

Unfortunately, learning Arabic reading skills is often considered monotonous and limited in interactivity. Traditional teaching methods tend to be passive, do not provide space for students to think critically or creatively, and not very engaging (Madden et al., 2022). This perception is a major challenge, especially in the context of the education of prospective Arabic teachers who are expected to be able to master language competencies comprehensively and teach Arabic with effective methods. To overcome this challenge, smart learning environments (SLE) are introduced as one of other innovative learning approaches. SLEs offer five main elements, namely showing (presentation of materials personalized to the needs of learners); manageable (flexible management of the learning environment); accessible (easy access to learning resources); real-time interaction (dynamic live interaction); and test (testing for evaluation of learning outcomes) (Huang et al., 2019).

The application of technology in education, such as the internet of things (IoT) and e-learning platforms, has proven effective in helping students understand learning materials more quickly and efficiently (Bdiwi et al., 2019; Chaudhary et al., 2014). In this context, a SLE provides access for prospective teachers to learn and apply technology-based learning models, which are increasingly important in this digital era (Lázaro et al., 2022). SLE-based learning is also relevant for

learning Arabic reading skills (*maharah qiro'ah*), as it not only enhances in-depth comprehension of the text, but also increases students' vocabulary retention, which in turn improves Arabic speaking and writing skills (Baroroh & Rahmawati, 2020; Buska et al., 2018; Hardyanto, 2017; Paris, 2005; Saini & Goel, 2019; Verhoeven & Perfetti, 2011).

In its implementation, learning *maharah qiro'ah* in a SLE uses technology such as Microsoft PowerPoint for material presentation, applications such as Quizizz and Kahoot for evaluation, as well as digital formats (portable document format – PDF and video) that increase the accessibility of the material (Machmudah, 2022). This approach aims to create an interactive learning environment, which encourages students' active involvement and enhances their critical and creative thinking skills (García-Tudela et al., 2021; Lestari & Alam, 2024; Ming-tak & Wai-shing, 2008; Zhang et al., 2019).

The relevance of SLEs in learning *maharah qirā'ah* aligns closely with the educational demands placed on prospective Arabic language teachers under the Indonesian National Qualifications Framework (KKNI), which emphasizes not only linguistic competence but also digital literacy, critical thinking, and professional ethics (Santoso et al., 2015). Prior studies indicate that technology-enhanced learning environments can facilitate multiple levels of learner comprehension, ranging from basic textual recognition (*al-harf*) to more creative and interpretive understanding (*al-ibdā'ī*) (Machmudah, 2022). However, existing research also reveals persistent challenges in preparing pre-service teachers to integrate technology effectively into pedagogy, particularly in developing instructional designs that meaningfully connect digital tools with learning objectives (Bdiwi et al., 2019; Dennis, 2016; Rapanta et al., 2020; Yu et al., 2019).

In recent years, learning environment research has expanded to include online learning experiences framed by the community of inquiry model (Chandrawati et al., 2024), classroom and environment management (Widiawati et al., 2024), virtual learning environment integration (Purnomo et al., 2024), self-organized learning environments (Lompoliuw et al., 2024), student engagement strategies (Subakti et al., 2024), and immersive learning technologies (Putra et al., 2024). While these studies underscore the importance of environmental factors, they largely conceptualize learning environments in terms of modality, management, or technological affordances, rather than as pedagogically structured frameworks for specific language skills.

Against this backdrop, the present study addresses this gap by examining a SLE – not merely as online instruction, but as a pedagogically grounded instructional ecology, encompassing the elements of showing, manageable, accessible, real-time interaction, and testing – specifically applied to Arabic reading skills (*maharah qirā'ah*). By situating SLE within Arabic language pedagogy, this study extends existing research on learning environments and responds to the need for adaptive, skill-specific instructional models for prospective Arabic language teachers in contemporary educational contexts.

This study contributes both theoretically and practically to language education. Theoretically, it extends learning environment research by positioning the SLE as a pedagogically grounded model for teaching Arabic reading, addressing a gap in prior studies that emphasizes technological tools rather than skill-specific instructional design. Practically, the implementation of SLE in higher education facilitates deep meaning construction through visually structured and progressive text presentation, supports critical and systematic thinking by reducing cognitive load through organized layouts, enables flexible and continuous learning via accessible digital materials, promotes direct feedback through interactive question-and-answer sessions, and integrates ongoing technology-based evaluation through platforms such as Quizizz.

Therefore, the research questions that guided this study were:

RQ1: How does the implementation of smart learning environments improve the Arabic reading skills of prospective Arabic language teachers?

RQ2: How do smart learning environments foster a competitive spirit among prospective Arabic language teachers at Islamic universities in Indonesia?

2. Literature Review

2.1 Smart Learning Environment (SLE) in Higher Education

SLE has emerged as a transformative pedagogical model in higher education, particularly in response to the demands for learner-centered, interactive, and technologically integrated educational systems. Huang et al. (2019) emphasized that an SLE is distinguished by personalized learning experiences, real-time feedback, and a high degree of user engagement that supports both self-directed and collaborative learning (Jing & Ismail, 2025).

This model is particularly important in language learning, where technologies such as multimedia resources and gamification have shown to facilitate deeper engagement and comprehension, extending educational opportunities beyond traditional classroom settings (Husein et al., 2023). As noted by Liao et al. (2024), the integration of human-machine feedback systems in SLEs is crucial for enhancing learning performance, allowing for customizable educational pathways that bolster cognitive engagement and adaptability in learners.

In the context of higher education in Indonesia, particularly within Islamic universities, the urgency to adopt SLEs aligns with a national digital transformation agenda. However, implementation in Arabic language pedagogy has not been as pronounced as in other disciplines (Husein et al., 2023). Studies reveal that integrating SLEs into Arabic teacher training programs can significantly elevate students' motivation and higher-order thinking capabilities, particularly when the content is culturally relevant (Albantani et al., 2022; Bdiwi et al., 2019). It is crucial that such implementations incorporate robust pedagogical scaffolding, as students in these contexts often face unique challenges related to resource accessibility, due to disparities in infrastructure between public and private educational institutions (Barreto et al., 2021). Moreover, advancements in educational technologies (Shardlow et al., 2021), indicate a significant shift in how

educational relationships are formed, with digital environments, integrated with AI, redefining pedagogical interactions.

Given the necessity of aligning educational practices with the competencies required in the 21st century, it is evident that adopting SLEs not only represents a technological improvement but also a fundamental pedagogical shift necessary for cultivating proficient language skills in Arabic and other subjects (Fu2022). The potential of SLEs to foster critical thinking, adaptability, and creative problem-solving underscores the transformative role these environments can play in higher education, especially as they continue to evolve alongside technological innovations (Дмитренко et al., 2023). As such, the strategic implementation of SLEs customized to the specific pedagogical needs of Arabic language learning presents both a challenge and an opportunity for higher education institutions moving forward.

2.2 Reading Skills Development in Arabic Language Learning

Reading in Arabic encompasses unique challenges, primarily attributed to its diglossic nature, complex orthography, and rich morphology. As noted by Saiegh-Haddad and Joshi (2014), these factors necessitate a rigorous mastery of phonological decoding, morphological awareness, and syntactic comprehension, which are foundational not just for linguistic proficiency but also for the pedagogical effectiveness of prospective Arabic teachers. In the context of Indonesian Islamic universities, students often encounter reading difficulties due to limited exposure to authentic Arabic texts, a lack of sufficient digital learning resources, and an over-reliance on traditional lecture-centered methodologies (Machmudah, 2021). The integration of SLEs could address these challenges effectively.

As emphasized by AbuSeileek (2007) and Alshumaimeri & Alhumud (2021) digital reading platforms and adaptive learning tools can significantly foster vocabulary acquisition, improve reading speed, and enhance comprehension accuracy, especially when complemented by formative feedback and collaborative learning opportunities. Liao et al. (2024) emphasized the importance of personalized feedback in SLEs, which can help create personalized learning paths that enhance students' engagement and learning outcomes. Thus, by leveraging SLEs, educator training in reading can become more interactive and contextually relevant, ultimately shaping more competent Arabic teachers capable of navigating the complexities of Arabic literacy instruction.

2.3 Competitive Spirit and Motivation in Smart Learning Contexts

The integration of competitive elements within SLEs can significantly enhance the educational experience for prospective Arabic teachers by fostering sustained motivation and engagement. Competition in learning contexts can stimulate both intrinsic and extrinsic motivation through pedagogical design features such as gamification, digital badges, leaderboards, and performance analytics (Almelhes, 2024). In the realm of teacher education, competition contributes notably to developing professional resilience, fostering collaboration, and enhancing self-efficacy, which are crucial competencies for future educators (Zhang et al., 2024). Studies have shown that gamified learning environments not only boost academic

achievement but also cultivate collaborative and reflective behaviors among learners. For example, a systematic literature review has indicated that a competitive framework within learning platforms can effectively enhance learners' engagement and academic performance (Almelhes, 2024).

Moreover, gamification in educational settings has been shown to cultivate perseverance and a mastery orientation in language learning, particularly within Arabic teacher training programs (Zhang et al., 2024). Such competitive frameworks encourage prospective teachers to engage more deeply with the material, promoting a dynamic and interactive learning atmosphere. The literature emphasizes that elements of gamification lead to improved motivation; for instance, gamified approaches have been observed to result in higher participation rates and intrinsic motivation among students (Mayor-Peña et al., 2024).

Furthermore, meaningful design and feedback mechanisms within gamified environments can significantly enhance students' learning experiences, aligning with psychological principles that support sustained engagement and achievement (Sappaile et al., 2025). Therefore, strategically implementing competitive elements within SLEs can not only improve reading performance in Arabic but also prepare pre-service teachers for the professional challenges they will face in a digitally mediated educational landscape.

Based on the literature reviewed, it is evident that while SLEs have been widely explored in general education contexts, research examining their implementation in Arabic language teacher education remains limited – particularly regarding the development of students' reading skills and competitive motivation. Most existing studies focus on technology adoption or student perceptions, rather than on measurable improvements in linguistic performance and affective engagement. Therefore, this study aimed to fill this gap by providing empirical evidence on how the integration of SLEs can improve Arabic reading skills and foster a competitive spirit among prospective Arabic language teachers at Islamic universities in Indonesia.

3. Methodology

3.1 Research Design

This study is based on an interpretive paradigm using a qualitative descriptive design to explore how the implementation of a SLE facilitates the development of Arabic reading skills and fosters a competitive spirit among prospective Arabic teachers at an Islamic university in Indonesia. A qualitative approach was chosen because it allows for an in-depth understanding of participants' experiences, perceptions, and behavioral changes in a real-life learning context (Creswell & Poth, 2018). Through this design, the study sought to capture the dynamic interaction between technology-based pedagogy and affective learning outcomes in a natural classroom environment.

3.2 Research Setting and Participants

This research was conducted at the Faculty of Tarbiyah and Teacher Training, an Islamic university in Indonesia offering an Arabic language education study program. The implementation of the SLE was integrated into the *qira'ah* (reading) course for one academic semester. Participants were selected using purposive sampling to ensure they met specific criteria relevant to the research focus (Patton, 2015). A total of 19 of 320 pre-service Arabic teachers participated in this study. They were fifth-semester students with previous experience in online or blended learning environments. This sample was deemed adequate for qualitative research, achieving data saturation and representing diverse perspectives (Guest et al., 2020).

3.3 Data Collection Techniques

Multiple qualitative data collection methods were employed to ensure data triangulation and credibility of findings, which are presented in Table 1.

Table 1: Data collection techniques

Technique	Focus of Observation / Data	Purpose	Duration / Implementation
Classroom Observation	<ul style="list-style-type: none"> Use of SLE features: real-time interaction, accessibility, manageability, and test adaptability. Students' engagement, collaboration, and competitive behavior during Arabic reading activities. 	To obtain authentic data on students' participation and interaction patterns in SLE-based learning sessions.	Conducted over 14 weeks throughout one semester. Field notes and observation sheets were used to document behavioral patterns and participation levels.
In-depth Interviews	<ul style="list-style-type: none"> Students' perceptions and experiences using SLE. Changes in motivation, learning autonomy, and competitive drive. Perceived improvement in reading comprehension. 	To explore students' affective and cognitive responses to SLE integration in the Arabic reading course.	Conducted with 19 participants at the end of the semester using semi-structured interviews lasting 30–45 minutes each, in Bahasa Indonesia.
Document Analysis	<ul style="list-style-type: none"> Student portfolios and reading performance records. Digital platform analytics (login frequency, test results, participation rate). 	To triangulate observational and interview data by identifying measurable progress in reading skills and engagement.	Collected continuously during the semester and analyzed qualitatively for recurring patterns and progress indicators.

3.4 Research Validity

Research validity was ensured through qualitative trustworthiness criteria, including credibility, dependability, confirmability, and transferability.

Credibility was established through data and method triangulation and verbatim participant quotations. Concurrently, dependability and confirmability were supported by systematic documentation, audit trails, and reflective checks using the Miles, Huberman, and Saldaña model. Transferability was addressed by providing rich contextual descriptions of the research setting, participants, and SLE implementation.

3.5 Data Analysis Procedures

Data was analyzed using Miles et al.'s (2014) interactive model of qualitative analysis, which consists of the following three main steps, evident in Table 2:

Table 2: Data analysis procedures

Stage of Analysis	Description of Process	Outcome / Focus	Strategies to Ensure Trustworthiness
Data Reduction	All raw data from classroom observations, interviews, and document analysis were transcribed and coded manually. The coding process focused on identifying recurring words, phrases, and categories related to <i>reading improvement</i> and <i>competitive spirit</i> .	Preliminary codes and subthemes reflecting students' behavioral, cognitive, and motivational patterns in the SLE.	Credibility enhanced through peer debriefing and consistent coding validation between researchers.
Data Display	The coded data were organized into thematic matrices and visual charts to map the relationships between SLE features (e.g., accessibility, interaction, adaptability) and observed learning outcomes (motivation, collaboration, performance).	Clear thematic relationships show how SLE components contribute to reading engagement and competition.	Transferability strengthened by providing detailed contextual descriptions of learning activities and participant interactions.
Conclusion Drawing and Verification	Final themes were synthesized to interpret the influence of SLE on cognitive (reading skills) and affective (competitive spirit) learning domains. Member checking with participants was conducted to confirm accuracy and reliability of interpretations.	Validated themes representing the pedagogical and psychological impact of SLE implementation.	Dependability and confirmability ensured through triangulation, audit trails, and documentation of analytical decisions.

3.6 Ethical Considerations

This study adhered to ethical principles of qualitative inquiry. Formal approval was obtained from the university's research ethics committee. All participants provided written informed consent, stating their voluntary participation and the

right to withdraw at any time. Data confidentiality was maintained through pseudonyms and secure digital storage. Observations and interviews were conducted with due regard for participant privacy and institutional guidelines. The researcher acted as a participant observer, facilitating the SLE-based reading activities while maintaining reflective neutrality. A reflexive journal was used to document the researcher's biases, assumptions, and decisions throughout the research process to ensure transparency and minimize subjectivity.

4. Results and Findings

Language learning in the digital age requires active student involvement and meaningful interaction. The application of SLE in teaching Arabic reading skills (Maharah Qirā'ah II) in the International Class Program, Arabic Language Education Study Program, Faculty of Tarbiyah and Teacher Training (FITK) UIN Malang, enables students to engage through presentations as a result of critical analysis of text analysis, systematic management of digital materials, collaborative interaction, and technology-based evaluation. Research data were obtained through classroom observation, semi-structured interviews, and document analysis. The following findings explain how each component of SLE contributed to realizing the competence of prospective Arabic teachers in accordance with KKNi standards.

4.1 Application of Smart Learning Environment in Arabic Reading Learning

Table 3 presents an analytical overview of the application of SLE components in Arabic reading instruction. This table serves as a conceptual map linking SLE components to pedagogical practices, which are further analyzed using qualitative data.

Table 3: Application of smart learning environment and technology in Arabic reading learning

No	Aspects	Application in Learning Arabic Reading Skills	Technology (application) used
1	Showing	Students present material visually with slides that can include text, images, and videos.	PowerPoint, video
2	Manageable	Through various slide layouts and designs that facilitate information organization.	PowerPoint
3	Accessible	Presentations are easily accessible as they are shared in digital format (PDF).	PowerPoint
4	Real Time Interaction	Provides immediate feedback through questions and answers between the presenting student and the rest of the class.	Kahoot/ Quizizz
5	Test	To test the role of technology in learning, effectiveness is proven by the test results given at the end of each lesson. Results can be known immediately.	Kahoot/ Quizizz

4.1.1 Showing Aspect: Presentation and Construction of Text Meaning

The showing aspect was realized through students' presentations of material using Arabic texts in accordance with group assignments. Students divided roles

in reading texts, explaining difficult vocabulary, interpreting paragraph content, and summarizing texts. Lecturers acted as facilitators in the learning process.

One student stated:

“When preparing the presentation, I had to really understand the meaning of the vocabulary and the content of each paragraph, because my friends could ask questions directly.” (Participant 4)

This quote shows that the presentation activity encourages students to read more deeply and reflectively. The requirement to explain the text to others forces students not only to read literally but also to understand its meaning and the relationships among its parts.

An analysis of documents in the form of video recordings of presentations and quiz results (Figure 1) shows that most students answered the comprehension questions correctly, indicating an increase in reading comprehension.



Figure 1: Percentage of students

4.1.2 Manageable Aspect: Organization of Material and Cognitive Support

The manageable aspect was evident in the organization of learning materials through systematically arranged, clearly labeled slides. The slide layout helped students follow the text's complex flow.

“The slides are neat and organized, so it's easier for me to understand the content without getting confused.” (Participant 7)

This finding shows that good material management helps reduce students' cognitive load and supports a systematic reading process, especially in understanding the morphological and syntactic structure of Arabic.

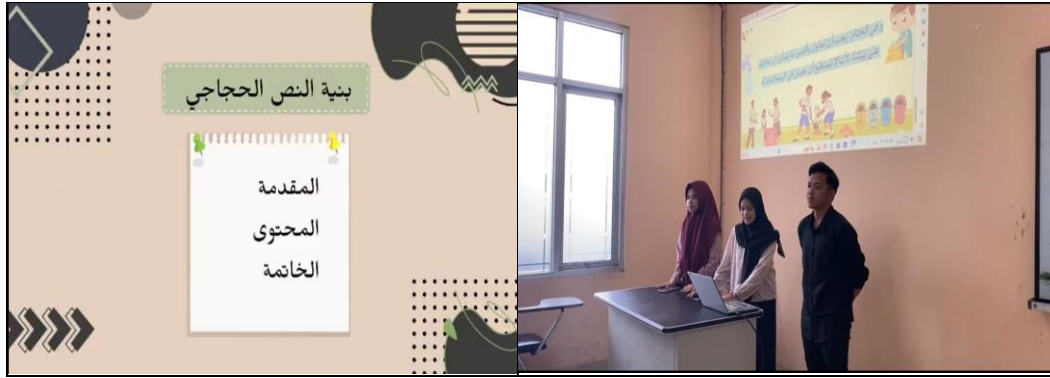


Figure 2: Illustration of manageable aspect

4.1.3 Accessible Aspect: Flexible Access to Learning Materials

Accessibility was achieved by distributing materials in digital formats such as PDFs, videos, and Google Forms. Materials could be accessed outside of class hours.

“Because the materials are distributed in PDF format, I can reread them at home and be better prepared for class discussions.” (Participant 10)

This quote shows that flexible access to materials supports independent learning and allows students to deepen their understanding of the reading material through repetition.

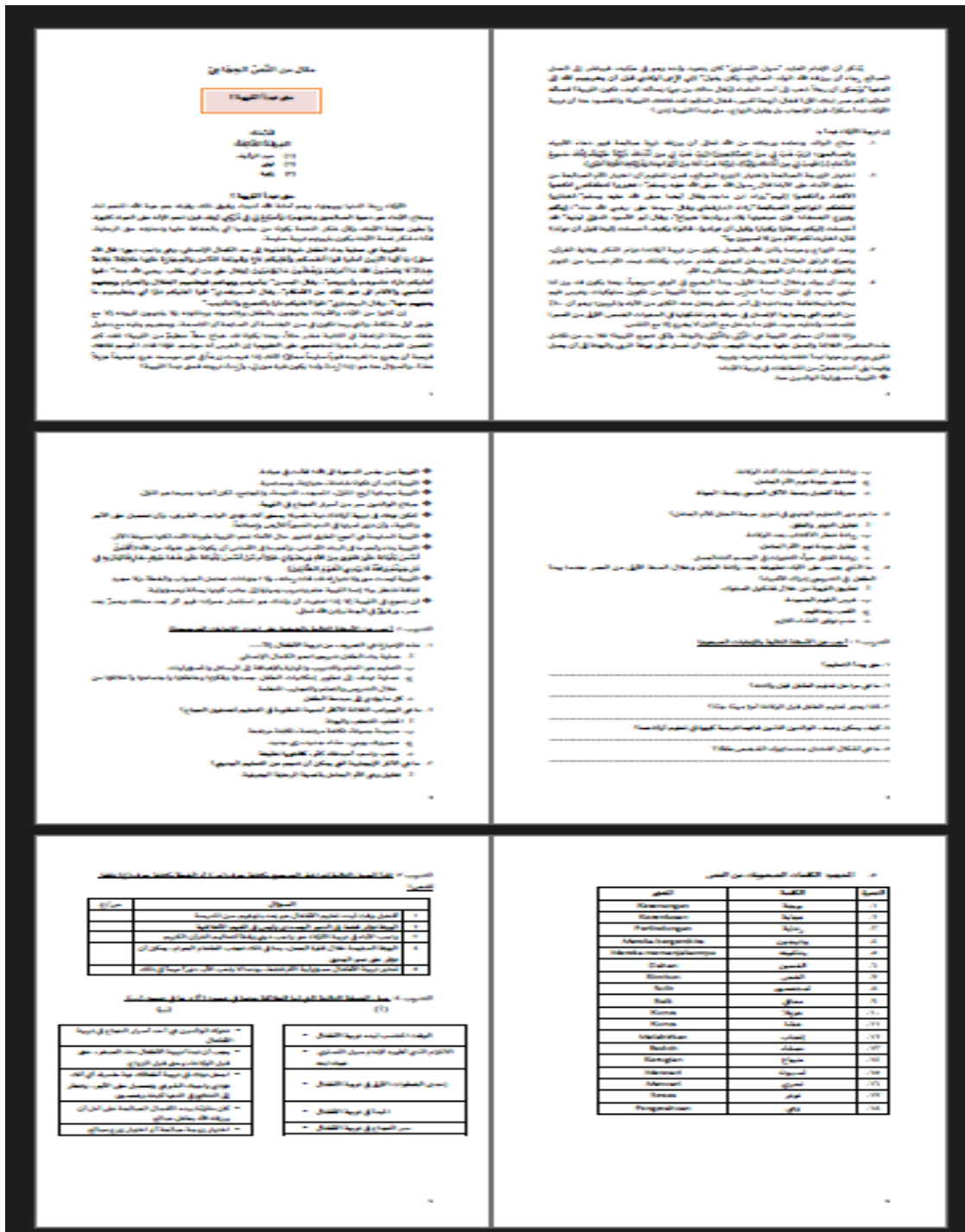


Figure 3: Illustration of accessible aspect

4.1.4 Real-Time Interaction Aspect: Direct Feedback and Critical Reading

Real-time interaction occurred through question-and-answer sessions after presentations and during student discussions. Students asked each other questions about vocabulary, sentence meaning, and paragraph conclusions.

“During discussions, I have to explain why a sentence has a certain meaning, so I can’t just answer randomly.” (Participant 12)



Figure 4: Illustration of real time interaction aspect

These findings indicate that direct interaction encourages students to develop critical reading skills and the ability to explain the meaning of texts in an argumentative way.

4.1.5 Test Aspect: Technology-Based Evaluation

The evaluation was conducted using the Quizizz and Kahoot applications at the end of the lesson. Students received their evaluation results immediately.

“After the quiz, I immediately knew which parts of the text I didn’t understand.” (Participant 6)

This shows that technology-based evaluation serves as instant feedback that reinforces reading comprehension and motivates students to correct their mistakes.



Figure 5: Illustration of test aspect

4.1.6 Document Analysis: Levels of Reading Comprehension

Table 4 shows the relationship between learning activities and the achievement of various levels of reading comprehension, ranging from letter comprehension (*al-ḥarf*), content comprehension (*adz-dzimnī*), critical comprehension (*an-naqdī*), appreciative comprehension (*tadzawwuq*), to creative comprehension (*al-ibdā'ī*).

Table 4: Learning activities and comprehension objectives in language reading skills

No	Learning Activities	Empirical Evidence (Learning Artifacts)	Data Sources	Realized goals
1	Students compile a list of difficult vocabulary words and read texts with correct pronunciation	Vocabulary worksheets (<i>al-mu'jam</i>), video recordings of text readings, initial quiz results	Documents (worksheets, videos), classroom observations	Direct comprehension at the letter and word level (<i>al-ḥarf</i>)
2	Students read the text paragraph by paragraph and explain the content of each paragraph	Student presentation videos, text comprehension worksheets (<i>at-tadrīb 1 and 4</i>)	Documents (videos, Google Forms), classroom observations	Text comprehension (<i>adz-dzimnī</i>)
3	Students respond to and explain the reasons behind the statements in the text during the discussion session	Class discussion recordings, student responses to analytical exercises (<i>at-tadrīb 2</i>)	Class observations, documents (Google Forms), interviews	Critical understanding of the text content (<i>an-naqdī</i>)
4	Students interpret the implicit meaning and messages contained in the text	Students' reflective answers on the worksheet (<i>at-tadrīb 3</i>), results of class discussions	Documents (Google Form), class observations, interviews	Appreciative and inferential understanding (<i>tadzawwuq</i>)
5	Students create new sentences using vocabulary from the reading text	Video recordings of students creating sentences, examples of students' written sentences	Documents (videos, written assignments), classroom observations	Creative understanding (<i>al-ibdā'ī</i>)

The analysis of worksheets, learning videos, and evaluation results shows that students gradually achieved all five levels of reading comprehension. The data in this document reinforces the interview findings, which show that SLE-based learning supports the comprehensive and progressive development of Arabic reading skills.

4.2 The role of Smart Learning Environment in realizing the competence of Arabic language teacher candidates

The competencies of prospective teachers in accordance with the KKNi criteria that can be realized in learning Arabic Reading skills (*maharah qiro'ah*) are as in the following Figure 6:

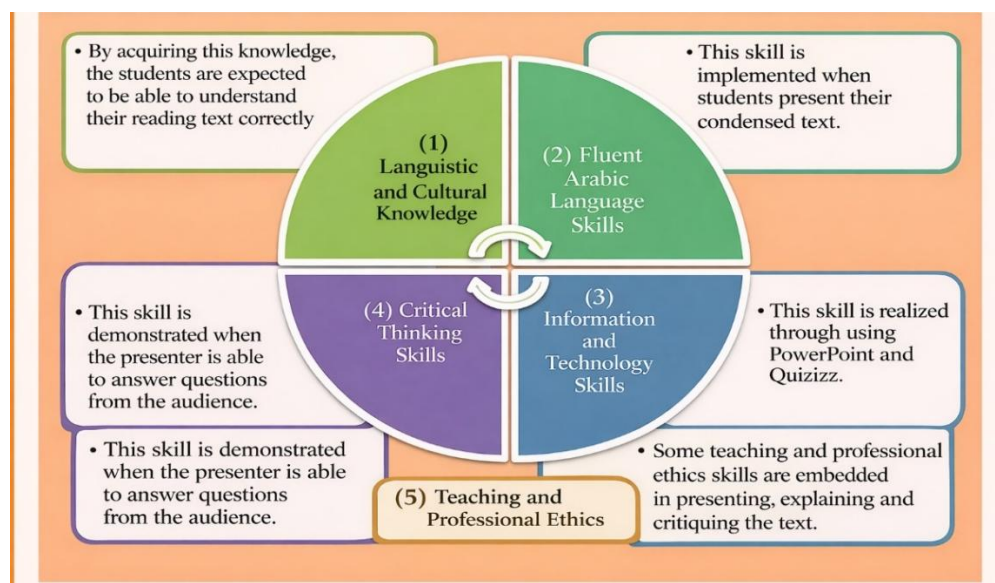


Figure 6: Competence of prospective teachers in accordance with IQF criteria in learning Arabic reading skills (*maharah qiro'ah*)

The figure shows that when viewed from the KKNi, five competencies were realized, namely 1) linguistic and 2) cultural knowledge, 3) fluent language skills, 4) skills in using information and communication technology, and 5) critical thinking skills. In contrast, two competencies were realized, namely 1) teaching skills and 2) professional ethics. However, some of the teaching skills were realized by presenting, explaining and criticizing the text. The students did not plan lessons because the planning was prepared by the lecturer. Professional ethics were also not realized because students did not teach the course (Nurchayani et al., 2022).

5. Discussion

5.1 Discovering Creativity and Critical Thinking as the Spirit of Learning and Competition in Smart Learning Environments

In an effort to realize a world-class university, UIN Maulana Malik Ibrahim studies and implements ideal, effective, and relevant learning, with international-standard campus development indicators. The process of improving human resources, especially majors that prepare students to become prospective teachers, is integrated into a campus environment that supports learning and working and is equipped with adequate digital facilities. The technology-based environment aims to establish an international standard for educational quality.

Using technology, such as PowerPoint, students are required to be creative in designing slide layouts that make the material clear and engaging, making

learning easier and more engaging. This kind of learning is in accordance with the theory of constructivism, in which students construct knowledge from experience. This theory aims to encourage students to learn from their own mistakes. By directly involving students in learning processes that engage motor and sensory aspects, students receive as much authentic stimulation as possible (Januszewski & Molenda, 2008).

According to Piaget, constructivism is a system of explanation of how students, as individuals, adapt and increase their knowledge (Budyastuti & Fauziati, 2021). In the “showing” component, constructivism is manifested when students present material in PowerPoint to help them build knowledge. After understanding the Arabic text obtained, students share it with their friends in the “manageable” component, aiming to make the material easier to understand for others. In order for this goal to be achieved, easy access (the “accessible” component) must be ensured by changing the material into PDF, video links, and Google forms. Students interact by asking questions and answering and directly answering quiz questions as an aspect of “real-time interactive and test”, which are all aspects of the theory of constructivism.

These findings indicate that Arabic reading instruction in higher education should be strengthened through linguistic and learning theories that emphasize cognitive processing, critical thinking, and active reading strategies, such as skimming and scanning (Piaget, 1970; Ausubel, 1968; Brown, 2007; Grabe & Stoller, 2011). Effective instruction also requires peer interaction and collaborative reading (Long, 1996; Gass & Mackey, 2007), supported by technology-mediated learning grounded in sociocultural theory (Vygotsky, 1978; Lantolf & Thorne, 2006). Within this framework, the SLE functions as a pedagogical space that integrates cognitive, social, and technological dimensions in Arabic reading instruction.

Compared with studies at the primary and secondary levels, which mainly report improvements in learning outcomes, motivation, and metacognitive skills through technology use (Dini et al., 2024; Reni Nia Zusinta, 2025), the present study demonstrates a more advanced impact of SLE in higher education. In contrast to conventional teacher-centered learning with limited technology and delayed feedback (Sanjaya, 2006), SLE implementation promotes higher student engagement, deeper text comprehension, and the development of critical and creative thinking, enabling learners to reach creative comprehension (*al-ibdā'ī*) within student-centered, interactive, and adaptive learning environments (Hwang, 2014; Spector, 2014; Zhu et al., 2016).

The findings of this study need to be interpreted within the social, cultural, and institutional contexts that frame Arabic language learning in Indonesian Islamic universities. Locally, the academic culture of UIN Maulana Malik Ibrahim Malang, which emphasizes collaboration, group presentations, and scientific discussions, contributes to the effectiveness of the Smart Learning Environment (SLE) implementation in encouraging interaction, shared responsibility, and active student engagement. More broadly, the concept of *fiqh al-ijtima'iyah* is understood as an approach to Islamic law that emphasizes the application of

Islamic values in the social, educational, and community spheres, rather than as a rigid juridical doctrine. Therefore, the relationship between SLE and *fiqh al-ijtima'iyah* in this study is conceptually positioned as a value alignment between pedagogical innovation, contextual learning, and the strengthening of Islamic social ethics (Adiyono & Sholeh, 2025). With this approach, Arabic language learning can be redefined as an integrative space that connects technology, 21st-century competencies, and socio-Islamic values without claiming normative authority in the realm of formal fiqh. At the national level, the Indonesian education system's focus on competency-based learning, digital literacy, and academic competition, as reflected in the KKNi framework. It also provides an enabling ecosystem for the development of creativity and critical thinking through technology-enhanced instruction. Within the Indonesian Islamic context, Arabic functions not only as a foreign language but also as a language of religion and scholarship, rendering reading activities inseparable from ethical, religious, and cultural values that reinforce the purpose of *maharah qirā'ah* learning.

Although this study focuses on Arabic reading skills, the findings indicate that improved reading competence contributes to vocabulary development, deeper morphological and syntactic awareness, and enhanced discourse understanding, which in turn support speaking and writing skills. The implementation of SLE strengthens this integrative process through repeated exposure to texts, peer interaction, and reflective feedback, thereby cascading into the overall development of Arabic language proficiency among Indonesian university students. Creativity and critical thinking foster the spirit of competition among prospective Arabic language teachers, as evidenced by the many achievements of students participating in reading skills classes (*maharah qiro'ah*) that apply the SLE. Table 5 shows some of the championships achieved:

Table 5: National and international winners of International Class Program 2022-2024

No	Competition Name	Year	Level	Total Winner
1	News Reading	2022	National	2
2	Kitab Reading			2
3	Poetry Reading			1
4	Singing in Arabic			8
5	Debate in Arabic			2
				15
1	News Reading	2023	National	1
2	Classical Kitab Reading			2
3	<i>al-Qur'an</i> Understanding			1
4	Debate in Arabic		National 5 dan International 1	6
5	Singing			5
6	Speech in Arabic			1
7	Essay Writing		National 3 dan International 1	4
				20

1	<i>al-Qur'an</i> Understanding	2024	National	2
2	<i>al-Qur'an</i> Reading			1
3	Speech in Arabic			1
4	Essay Writing			1
5	Debate in Arabic			1
				6

In 2022, 15 winners won five national-level competitions. In 2023, there were 20 winners at the national level and two at the international level. In 2024, there were six national-level winners. In 2022, three of five competitions required Arabic reading skills (*maharah qiro'ah*), namely reading news, reading books and reading poetry. In 2023, three types of competitions directly related to reading skills, namely reading news, reading classical books, and understanding the *Qur'an*. In 2024, there were two competitions, namely the competition for understanding the *Qur'an* and reading the *Qur'an*.

This study proposed a conceptual model that positions the SLE as a pedagogical framework mediating the development of Arabic reading skills through the integration of cognitive, social, and technological processes. The model comprises five interrelated components—showing, manageable, accessible, real-time interaction, and test—that collectively structure the learning ecology. The components of “showing” and “manageable” are grounded in constructivist and cognitive theories emphasizing meaning construction and knowledge organization (Piaget, 1970; Ausubel, 1968). The component “real-time interaction” draws on the interactionist theory highlighting peer interaction and negotiation of meaning (Long, 1996; Gass & Mackey, 2007).

The “accessible” component reflects sociocultural theory, positioning technology as a mediational tool for social and cultural engagement (Vygotsky, 1978; Lantolf & Thorne, 2006), and the “test” component aligns with formative assessment and smart education frameworks by providing immediate feedback and adaptive learning. Empirical evidence from observations, interviews, and learning artifacts demonstrates a progression in students’ reading comprehension from direct understanding (*al-harf*) to creative comprehension (*al-ibdā'i*), confirming the theoretical coherence of the proposed model.

5.2 The Impact of SLE Learning on the Competency Development of Prospective Arabic Teachers in Indonesia

There are several learning perspectives that are also applied to learning for prospective Arabic teachers in International Class Program classes, namely the sociological perspective, psychological perspective, and ecological perspective. The sociological perspective appears in the aspect of “showing”: when the process of making a PowerPoint is done in groups through teamwork, the application of the sociological perspective is realized, where each team member is required to understand each other’s roles. The presentation of social facts is very important in active learning (Russell, 2012). In the “manageable” aspect, the psychological perspective is realized where students are mentally required to follow the changes of the learning process from each step that must be passed. The “accessible” aspect

applies the ecological perspective where students understand why certain media or devices must be used.

According to Zhao and Frank (2003), the ecological perspective is about how and why an educator receives and uses information communication technology in education. The “interactive real-time” component that applies a psychological perspective can be seen when students actively collaborate, answer friends’ questions, and respond to lecturers. This can be realized when there is an awareness from students that it is important to pay attention to teamwork.

Psychological perspective is the process of a person’s acceptance of an idea, information, and innovation received through the process of thinking awareness and the ability to use technology better to create innovation (Hall & Hord, 2015). The “test” component applies an ecological and psychological perspective because exams and assignments are evident. This may be in the form of making Quizizz, in which students are required to be creative and innovative in making and utilizing this learning media. Students are able to think critically, creatively, and effectively so that they can help students face educational competition in the international arena.

Although the current implementation of the SLE is effective, future developments are expected to refine learning strategies further in response to rapid technological advancements. The integration of machine intelligence, cloud computing, sensor networks, and interdisciplinary approaches is projected to enhance learning experiences and improve communication between teachers and students (Kim et al., 2018; Kaur et al., 2022; Zhang et al., 2019). In line with broader educational trends, both formal and non-formal education are increasingly shifting from offline to distance or online learning, positioning SLE as a relevant and adaptable framework for future education (Riaz & Jawaid, 2022).

The findings of this study position the implementation of SLEs within the digital learning ecology and smart education framework (Huang et al., 2019), which emphasizes adaptability, interactivity, and data-driven personalization. By enhancing Arabic reading skills and fostering a competitive learning spirit among prospective teachers, SLE creates a dynamic learning ecosystem that integrates cognitive, affective, and technological dimensions. Given the complex morphological and syntactic demands of Arabic language learning, SLE provides essential scaffolding through real-time feedback, adaptive assessment, structured learning pathways, and gamified digital tools that enhance engagement, autonomy, and higher-order thinking (Zhu et al., 2016; Yu et al., 2020).

Moreover, the adaptability of SLE across diverse cultural and linguistic contexts supports learner-centered and inclusive pedagogies, contributing to the development of global digital competence, while maintaining cultural relevance and ethical considerations in Arabic language education (Li & Wong, 2021).

5.3 Pedagogical Implications

The findings show that integrating SLEs into Arabic language education enhances students' reading comprehension and engagement through personalized, interactive, and data-driven learning experiences. This supports Huang et al. (2019), who argued that SLEs foster adaptive pedagogy by enabling instruction personalized to learners' needs (Asli-Badarneh & Leikin, 2019). Real-time interaction and accessibility features provide immediate feedback and authentic reading experiences, which are essential for developing higher-order literacy skills amid the diglossic complexity of Arabic (Schiff & Saiegh-Haddad, 2018). Consequently, SLEs facilitate a shift toward learner-centered pedagogy, allowing educators to address the linguistic challenges of Arabic learning more effectively (Tibi et al., 2021).

Additionally, this study highlights the importance of digital learning environments that support students' affective and motivational dimensions, particularly competition, self-regulation, and resilience. Guided by the self-determination theory, competitive and gamified activities within collaborative frameworks can enhance intrinsic motivation and engagement (Saiegh-Haddad & Haj, 2018). Features such as leaderboards, peer challenges, and performance analytics in SLEs foster healthy competition while sustaining cooperative learning, thereby improving reading proficiency and essential 21st-century skills, including digital literacy, perseverance, and reflective thinking (Mamari et al., 2025).

Consistent with this, gamified learning has been shown to engage learners actively and improve both performance and attitudes toward reading (Asli-Badarneh & Asadi, 2023). Thus, SLEs offer a strategic approach to strengthening Arabic language skills alongside learners' personal and motivational development in digital learning contexts. The integration of SLEs in Arabic language learning at Islamic higher education institutions expands the practice of competency-based evaluation as developed in basic education, while strengthening pedagogical continuity across educational levels (Hayat & Adiyono, 2025).

The implementation of SLEs in Islamic higher education must align with institutional values and local cultural contexts to ensure moral integrity and social relevance. Educational technology should be integrated with ethical and cultural dimensions to sustain pedagogical effectiveness and reflect Islamic principles (Astra et al., 2024). In this regard, the modernization of Arabic language education through SLEs offers Islamic universities a strategic pathway to enhance pedagogy while preserving moral and cultural identity, particularly by embedding character education within digital learning environments (Fandir, 2024). By integrating ethical values into SLE-based instruction, educators can foster integrity, responsibility, and communal awareness (Iqbal et al., 2022), ensuring that technology functions not only as a tool for academic advancement but also for character formation and ethical citizenship in a rapidly evolving digital landscape.

6. Limitations and Future Directions

This study is limited by its contextual scope, as it was conducted within an international Arabic language education class at a single Indonesian Islamic university, thus restricting broader generalization. Employing a qualitative design with a limited participant sample, the findings emphasize contextualized learning processes derived from observations, interviews, and document analysis, rather than measurable instructional effectiveness. Future studies are encouraged to involve diverse institutional settings and mixed methods designs to strengthen analytical rigor and transferability.

7. Research Recommendations

7.1 Practical Recommendations

The practical steps that can be taken to solve the problem of learning Arabic at universities are: 1) utilizing a learning process that combines technology with pedagogical aspects through student presentations based on the principles of text analysis, creativity in IT-based content management, processes that facilitate access and interaction between students, and continuous testing; and 2) maximum institutional support.

7.2 Recommendations for the Education System

7.2.1 For the Indonesian context

Future studies should employ mixed-methods or quasi-experimental designs to examine the measurable impact of SLEs on reading achievement, motivation, and learner autonomy, while clarifying how learning processes mediate these outcomes. Research should also involve more diverse samples across study programs, institutions (public and private), and regions to capture variations in infrastructure readiness and learning cultures. Additionally, developing instruments for assessing prospective teachers' digital-ethical literacy, including moderation and competitive learning practices, remains a crucial research agenda.

7.2.2 For other educational system contexts

In broader educational contexts, SLE research should prioritize comparative studies examining implementation success across variables, such as infrastructure readiness, educators' digital literacy, real-time feedback design, and assessment models. Such studies are essential for evaluating the sustainability of SLE adoption, potential platform dependency, and their contribution to the development of inclusive smart education systems.

8. Conclusion

Through the application of SLE, which includes components of showing, manageable, accessible, real-time interaction and test, the learning objectives of *maharah qiro'ah* can be realized. At the same time, the demands of KKNI competencies, namely linguistic knowledge, fluent Arabic language skills, culture, information and technology skills and critical thinking skills, can also be realized. This research provides a solution to the problem of learning *maharah qirā'ah*, which has tended to be passive and centered on conventional methods, through the application of constructivist learning theory, which encourages

students to be active, creative, think critically, and interact meaningfully in the learning process.

This solution can be applied through the management of technological facilities in an institution, good internet access, and testing the reliability of facilities, so that the learning process can create an interactive environment, in which students can display their ability to understand lessons according to the expected goals. The results of this study also show that the realization of Arabic reading skills can foster a spirit of competition to encourage students to take part in society and show their skills both at national and international events.

Areas of focus for further research are aspects that can support the effectiveness of SLE learning in Arabic reading skills or other skills. From the description of this scientific work, it can also be concluded that the realization of the learning objectives of *maharah qiro'ah* and the national qualification standards for Arabic language graduates can be realized through learning based on the SLE. Furthermore, this study opens up opportunities for further exploration of how SLEs can be developed and adapted to various learning contexts in Islamic higher education.

Future research could focus on integrating SLEs with emerging technologies, such as artificial intelligence-based feedback systems or adaptive learning analytics, to provide more personalized learning for Arabic language learners. Researchers could also examine how teacher readiness, digital pedagogy training, and institutional support influence the sustainability of SLE implementation. Further investigation involving a larger and more diverse population would enhance understanding of how technology-enhanced environments shape not only students' language skills but also their character, motivation, and digital ethics as future Arabic language educators.

9. Conflict of Interest

No potential conflict of interest was reported by the author(s).

10. Acknowledgments

The author thanks the Islamic State University (UIN) Maulana Malik Ibrahim Indonesia for allowing us to conduct this research, as well as the informants who were willing to provide in-depth information for this study.

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Appendix 1

Observation and interview guidelines

Aspect / Focus	Indicators Observed or Asked	Data Source	Purpose of Data Collection
1. Reading Skill Development (Maharah Qira'ah)	- Students' ability to understand Arabic texts through the SLE platform.- Accuracy in pronunciation, vocabulary comprehension, and syntactic understanding.- Active participation in reading tasks and digital exercises.- Evidence of improvement from initial to final performance.	Classroom observation, student portfolios, and SLE analytics.	To identify the extent to which the SLE supports reading comprehension and linguistic fluency.
2. Smart Learning Environment (SLE) Engagement	- Frequency and intensity of platform use (log-in data, task completion, interaction records).- Utilization of SLE features: showing, manageable, accessible, real-time interaction, and test.- Student collaboration and peer support within the SLE.	Digital platform logs, observation sheets, and interview transcripts.	To analyze the relationship between SLE engagement and student motivation in reading activities.
3. Spirit of Competition	- Students' enthusiasm in classroom and online challenges.- Participation in intra-campus or national competitions.- Expression of pride and confidence in demonstrating reading skills.- Positive competition behaviors (peer encouragement, self-improvement efforts).	Observation, interviews, and institutional achievement records.	To explore how the SLE environment fosters a competitive yet collaborative learning culture.
4. Student Motivation and Reflection	- Students' self-perception of learning progress.- Attitudes toward technology-based learning.- Perceived challenges and benefits of SLE.- Motivation to continue improving reading skills independently.	Semi-structured interviews (30-45 minutes per participant).	To understand learners' emotional and cognitive responses to SLE implementation.
5. Pedagogical and Institutional Support	- Lecturer's facilitation and feedback style.- Availability and reliability of technological infrastructure.- Institutional encouragement for innovation and competition.- Integration of SLE into curriculum and assessment.	Document review, lecturer interviews, and observation of classroom management.	To determine institutional readiness and pedagogical strategies that sustain effective SLE implementation.

Appendix 2

Semi-structured interview protocol

No.	Main Interview Question	Probing Questions	Intended Information/ Purpose
1	How do you describe your experience using the Smart Learning Environment (SLE) during Arabic reading lessons?	- What features do you use most often? How does SLE differ from traditional classroom learning?	To explore students' overall perceptions and engagement in SLE-based learning activities.
2	What aspects of the SLE help you improve your Arabic reading comprehension?	- How do real-time interaction and digital feedback affect your understanding? Which tools or exercises are most helpful for you?	To identify effective components of SLE that support reading skill development (<i>maharah qira'ah</i>).
3	In what ways has the SLE influenced your motivation and learning autonomy?	- Do you feel more responsible for your own learning? Has your interest in reading Arabic texts increased?	To understand how SLE affects students' intrinsic motivation and independent learning habits.
4	How does the SLE encourage a sense of competition among you and your peers?	- Do you enjoy competing in digital reading tasks or challenges? How does competition influence your performance?	To analyze the role of SLE in fostering students' <i>spirit of competition</i> and collaborative engagement.
5	What challenges have you faced while using the SLE platform?	- Were there any technical, linguistic, or motivational difficulties? How did you overcome these challenges?	To identify barriers to SLE implementation and student adaptation.
6	How do lecturers and peers support you in using the SLE effectively?	- What kind of feedback do you receive from lecturers?-Do peers help you in solving technical or reading difficulties?	To examine pedagogical and social support factors influencing SLE success.
7	What kind of reading or learning activities would you like to see improved in future SLE-based courses?	- Would you prefer more interactive materials or competitive features? What suggestions would you give for improving this system?	To collect constructive feedback for future enhancement of SLE design and practice.
8	How has your participation in SLE-based learning affected your confidence in reading Arabic texts publicly or in competitions?	- Have you participated in reading contests or events? Do you feel SLE prepared you for such challenges?	To evaluate how SLE contributes to students' confidence, public performance, and readiness for national or international competitions.