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Design of Integrating Qalam AI and Language Teacher Competencies in Evaluating Arabic Reading Skill

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ABSTRACT

The development of technology in the field of education saw several advancements. One of these advancements was marked by the massive use of artificial intelligence technology, including in the evaluation of Arabic language learning. In response to this development, technological advancements had to be balanced with human competencies so that learning did not rely entirely on technology but was integrated with human thinking abilities. This research aimed to design an evaluation of Arabic reading skills based on the integration of Qalam AI and language teacher competencies. This study employed a descriptive qualitative approach, which was then practiced in learning through field experiments involving 150 respondents. Data collection methods include interviews, documentation, literature studies, and reading skill tests. The analysis used was descriptive analysis, as it focused solely on the evaluation design based on the integration of Qalam AI and language teacher competencies. Access to Qalam AI technology could be found at the website: <https://qalam.ai/>. The results of the study indicated that the design of the evaluation for Arabic reading skills based on the integration of Qalam AI and language competencies could be simulated in six stages: 1) Arabic language learning based on Qalam AI, 2) Arabic reading skill tests, 3) Utilization of Qalam AI, 4) Application of language teacher competencies, 5) Diagnosis and placement, 6) Evaluation.

Evaluation design; reading skills; qalam ai; language teacher competencies

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مستخلص البحث

شهدت تكنولوجيا التعليم تطورات عدة. ومن بين هذه التطورات، يتميز الاستخدام الواسع لتكنولوجيا الذكاء الاصطناعي، بما في ذلك في تقييم تعلم اللغة العربية. استجابةً لهذا التطور، يجب أن يتوازن التقدم التكنولوجي مع الكفاءات البشرية، بحيث لا تعتمد عملية التعلم بالكامل على التكنولوجيا، بل يجب دمجها مع قدرات التفكير البشري. تهدف هذه الدراسة إلى تصميم تقييم مهارات القراءة باللغة العربية بناءً على دمج Qalam AI وكفاءات معلمي اللغة. تستخدم هذه الدراسة منهجًا وصفيًا نوعيًا يتم تطبيقه بعد ذلك في التعلم من خلال تجارب ميدانية تشمل 150 مستجيبًا. تشمل طرق جمع البيانات المقابلات، والتوثيق، ودراسات الأدب، واختبارات مهارات القراءة. التحليل المستخدم هو التحليل الوصفي لأنه يركز فقط على تصميم

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التقييم القائم على دمج Qalam AI وكفاءات معلمي اللغة. يمكن الوصول إلى تكنولوجيا Qalam AI من خلال الموقع الإلكتروني: <https://qalam.ai>. تشير نتائج الدراسة إلى أن تصميم تقييم مهارات القراءة باللغة العربية المستند إلى دمج Qalam AI وكفاءات اللغة يمكن محاكاته في ٦ مراحل، وهي: (١) تعلم اللغة العربية المستند إلى Qalam AI، (٢) اختبارات مهارات القراءة باللغة العربية، (٣) استخدام Qalam AI، (٤) تطبيق كفاءات معلمي اللغة، (٥) التشخيص والتوظيف، (٦) التقييم.

الكلمات الرئيسية تصميم التقييم؛ مهارة القراءة؛ قلم؛ كفاءة المدرس اللغوية

INTRODUCTION

In the educational concept, the goal of Arabic language learning, according to Acep Hermawan (2014), was to enhance students' competencies in four skills: listening, speaking, reading, and writing (Rizki, 2017). Meanwhile, evaluation in the learning process was one essential element that educators did not overlook (Arsyad Itsarul Ikhwan, Syihabuddin, & Ali, 2021; Hidayat & Asyafah, 2019). The evaluation process or activities in education aimed to identify students' shortcomings or successes; if there were deficiencies, improvements need to be made (Ramadhani, 2019). This evaluation was crucial in the educational world because one of its functions was to select, diagnose, place, and measure an object (Dony Handriawan, 2021). Therefore, the evaluation of Arabic language learning aims to select, diagnose, place, and measure students' competencies in the four language skills mentioned above. From this explanation, it was evident that the function of evaluation in education was vital for making improvements based on all deficiencies found in the teaching and learning process. From the explanation above, the researcher viewed that there was no technology-based evaluation tool that could fully replace humans in the evaluation of Arabic language learning. Although there were technologies such as Quizzz and computer tests that could be used for evaluation (Daryanes & Ririen, 2020), these tools had limitations in assessing human abilities comprehensively. Therefore, there was a need for integration between technology and humans in developing more accurate and effective evaluation tools. Thus, the role of humans remained as technology continued to evolve.

Regarding the evaluation of Arabic language learning, there were several previous studies that served as the foundation for the state of the art in this research. Among these previous studies were: First, research conducted by Aqil M. Azmi et al. titled "AAEE – Automated Evaluation of Students' Essays in Arabic." This study discussed computer-based evaluation, particularly on Arabic essay worksheets. The system was presented to automatically assess students' Arabic essays in schools. The operation of this system relied on semantic analysis and sentence structure theory (Azmi, Al-Jouie, & Hussain, 2019). Second, research conducted by Suci Ramadhanti Febriani et al. titled "Design of Arabic Learning for Senior High School in the 21st Century." The results of this study indicated that the design of learning evaluation should include several aspects, such as: 1) constructing materials based on contextual content, 2) using technology and information, 3) employing cooperative learning models based on HOTS (Higher Order Thinking Skills), and 4) using authentic assessment (Febriani, Wargadinata, Syuhadak, & Ibrahim, 2020). Third, an article written by Dalila Souilem Boumiza and Wiem Ben Khalifa titled "Design an Evaluation System in E-Learning Arabic Language." The findings indicated that the development of Arabic language learning evaluation included a focus on developing

morphological analysis tools in Arabic that support grammar such as text parsing, determining word properties, and searching within texts (Boumiza & Ben Khalifa, 2012). From these three previous literature reviews discussing programs that could be utilized in conducting evaluations of Arabic language learning, it can be concluded that the novelty of this research lies in integrating artificial intelligence technology and language teacher competencies—an aspect not addressed in prior studies. Based on this exposition, the aim of this research was to design an evaluation for Arabic reading skills based on the integration of Qalam AI and Language Teacher Competencies.

Language teacher competencies referred to a teacher's ability to use language as a communication tool. This competency encompassed four aspects, including: 1) First, Grammatical Competence, which was the ability to understand language from the aspects of vocabulary, grammar, pronunciation, spelling, and word formation. These elements were deeply embedded in the communication process; 2) Second, Sociolinguistic Competence, which was the ability to use language in its social context or the environment in which one lives, including specific expressions used in that environment; 3) Third, Discourse Competence, which was the ability to connect ideas. What comes to mind could be expressed in words or sentences as part of communication; 4) Fourth, Strategic Competence, which is the ability to use strategies when one's knowledge of the language was very limited (Rizki, 2023).

In recent years, technological development accelerated rapidly. This development became an integral part of human life (Chassignol, Khoroshavin, Klimova, & Bilyatdinova, 2018). The advancement of technology in this digital era brought radical changes in various fields, including education (Rizki, Rohman, & Ghofur, 2023). Educators saw opportunities to utilize AI-powered capabilities such as speech recognition to support the enhancement of lessons and processes for discovering, selecting, and adapting materials for teaching and learning (Education & Technology, 2023; Kritandani, Aryani, & Rakasiwi, 2024). One product of technological advancement in the era of the Fourth Industrial Revolution was the emergence of artificial intelligence (AI) technology (Chen, Chen, & Lin, 2020). Artificial intelligence technology consisted of a complex set of activities used in adaptive learning and exhibits behaviors similar to human brain functions (Fahraini & Almaliki, 2023). Artificial intelligence technology transformed learning systems to be more adaptive (Xie, Chu, Hwang, & Wang, 2019). This indicated that the presence of technology provided many benefits in the teaching and learning process (Hwang, Xie, Wah, & Gašević, 2020). Therefore, it was not wrong to say that the position of artificial intelligence technology now seemed to have become a part of human life in the 19th century (Lesia Viktorivna, Andrii Oleksandrovych, Iryna Oleksandrivna, & Nadia Oleksandrivna, 2022). Thus, artificial intelligence technology became one of the keys to enhancing efficiency and productivity in various fields of life.

In the context of education, technology brought significant changes. One interesting example was the development of Arabic language learning integrated with artificial intelligence (Anwar & Ahyarudin, 2023). The integration of technology in Arabic language learning could utilize multimedia, computers, and the internet (Al Musawi, Al Hashmi, Kazem, Al Busaidi, & Al Khaifi, 2016). In that era of technological advancement, there were several technologies that could be utilized in Arabic language learning, especially in electronic learning systems such as Zoom, Google Meet, Quizizz, Kahoot, and others (Choiroh, 2021). However, despite the advancements in technology for Arabic language learning, human capabilities were still required in the teaching and learning process. Thus, these two elements—artificial intelligence and human competencies—had to synergize so

that human presence was not entirely replaced by technology. In order to improve the quality of Arabic language learning, it was essential to leverage both Artificial Intelligence technology and human capabilities. One integration that could be utilized, according to the researcher's perspective, was the use of Qalam AI in Arabic language learning. Qalam AI was a platform that offered various advanced features and could be utilized in Arabic language learning, particularly in writing and reading skills. Among the advanced features of Qalam AI were: 1) First, this platform could detect writing errors in Arabic (qawaid imla); 2) Second, it could provide automatic harakat according to applicable Arabic rules; 3) Third, it could display word forms (sighat) according to applicable sharaf (syntax) rules; 4) Fourth, it could offer alternative vocabulary tailored to the context of discussion; 5) Fifth, it could provide numerical writing (adad) in sentence form instead of numeral symbols. In addition to these features, Qalam AI could also provide text translation, assist in finding or detecting repeatedly written words, and offer direct human assistance, as Qalam AI was essentially a robot or artificial intelligence designed to mimic human intelligence realistically.

METHOD

This research essentially used a qualitative approach with a literature study method aimed at understanding the phenomena experienced by research subjects holistically and through descriptions in the form of scientific words and language, employing scientific methods (Lexy J. Moleong, 2017). The results of this literature study were then developed and practiced in a classroom setting. Thus, the discussion of this type of research includes experimental research, which aims to understand cause-and-effect relationships (Sugiyono, 2016). The experimental design of this research employs a poor experimental design approach with a one-shot case study type because it only involves the experimental class by applying an evaluation of Arabic reading skills based on Qalam AI and human competencies. The design of this research can be seen in the following table (Fraenkel, Wallen, & Hyun Helen H., 2012).

Table 1. Design eksperiment one shot case study

Treatment	Observation
X	O

The object of this research was the implementation of the integration of artificial intelligence technology based on Qalam AI and language teacher competencies. Meanwhile, the subjects of this research were students from several institutions. The selection of research objects and subjects was based on the increasing development of technology that had to be balanced by human competencies. Thus, the role of humans couldn't be fully replaced by technology. The data collection methods in this research included interviews, documentation, literature studies, and Arabic reading tests. Interviews were used to understand the evaluation methods for Arabic language learning. Documentation and literature studies were utilized to gather information about the application of Qalam AI in learning. Meanwhile, tests were conducted to assess students' scores, which will subsequently be evaluated for placement purposes. The analysis used in this research was descriptive analysis based on the results of literature studies and Arabic reading tests. This analysis will result in a design for evaluating Arabic language learning based on the integration of artificial intelligence technology and language teacher competencies.

RESULTS&DISCUSSION

Based on the results of interviews, documentation, literature studies, and Arabic reading ability tests, the design of the reading skills evaluation based on the integration of

Qalam AI and language teacher competencies could be simulated in several steps, namely: 1) Arabic language learning based on Qalam AI, 2) Arabic reading skills tests, 3) utilization of Qalam AI, 4) Analysis of Qalam AI results with the language competencies of teachers, 5) Placement of students' competencies, and 6) Evaluation. These steps could be explained in the following hierarchy:

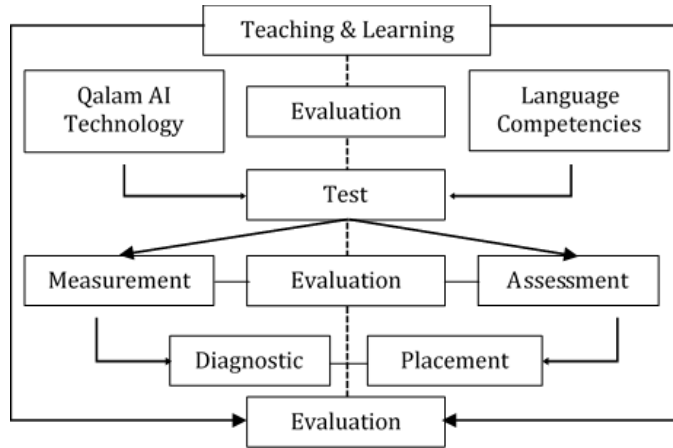


Figure 1. Hierarchy of Learning Evaluation

Based on Figure 1 regarding the hierarchy of learning evaluation, the stages of evaluating Arabic reading skills based on the integration of Qalam AI and Language Teacher Competencies can be explained as follows:

First, Arabic Language Learning Based on Qalam AI.

A teacher provided instruction on Arabic reading skills using the artificial intelligence technology Qalam AI. This Qalam AI technology could be accessed through the website: <https://qalam.ai/>. The Qalam AI technology could be utilized as a medium for teaching reading and writing due to its ability to detect writing errors (qawaid imla) and harakat errors (syntax). Below is the main display of Qalam AI in Arabic language learning.

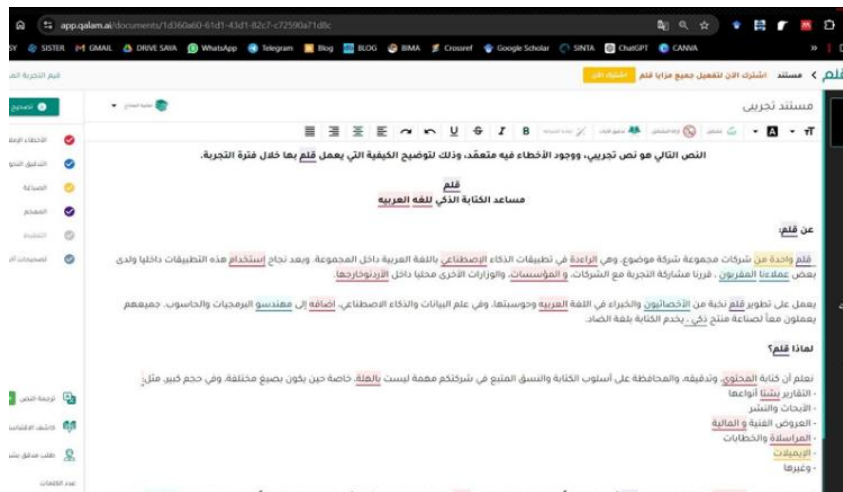


Figure 2. Qalam AI Display

Second, Arabic Reading Skills Test.

Once a teacher conducted the teaching and learning activities, evaluation in the next stage was essential. In this evaluation stage using a testing method, a teacher needed to create a test instrument that would be administered to the students. This test instrument contained a reading text in Arabic with 10 questions to be readed and expressed in written form. Each question (text) consisted of 10 sentences, resulting in a total of 100 sentences for the entire test. This aimed to facilitate the assessment process with a maximum score of 100. Below was the Arabic text that would be tested on the students, consisting of 10 sentences, each containing 10 words.

١. اسمي أحمد، أنا أحب اللغة العربية، العربية لغة القرآن والحديث.
٢. أستيقظ مبكراً، ثم أصلي الفجر، أتناول الإفطار، ثم أذهب للدراسة.
٣. أستيقظ صباحاً، أذهب إلى المدرسة، أدرس، أعود إلى البيت، وأنام مبكراً.
٤. أستيقظ صباحاً، أتناول الإفطار، أذهب للعمل، أعود إلى البيت، وأستريح مساءً.
٥. أدرس في الصباح، أتناول الغداء، أستريح قليلاً، ثم أقرأ كتاباً.
٦. أقرأ الكتب، أحفظ الدروس، أكتب الملاحظات، وأراجع المواد قبل الإمتحان.
٧. أتعلم اللغة العربية، أحفظ المفردات، أستمع للنصوص، وأمارس المحادثة يومياً.
٨. أحب اللغة العربية، أتعلم وأستمع إلى اللغة العربية كل يوم.
٩. اللغة العربية سهلة، هي لغة القرآن، يتكلم المسلمون باللغة العربية.
١٠. اللغة العربية هي لغة السماء ولغة كلام أهل الجنة.

Third, Utilization of Qalam AI

The utilization of Qalam AI at this stage was to detect the alignment of students' reading, which had been expressed in written form consisting of 10 questions with each question containing 10 sentences, against the applicable rules of the Arabic language. This was because one of the features of Qalam AI was its ability to determine the readability of Arabic texts based on nahwu (syntax) and sharaf (morphology) rules. Below were the results of Qalam AI's analysis of the Arabic text.

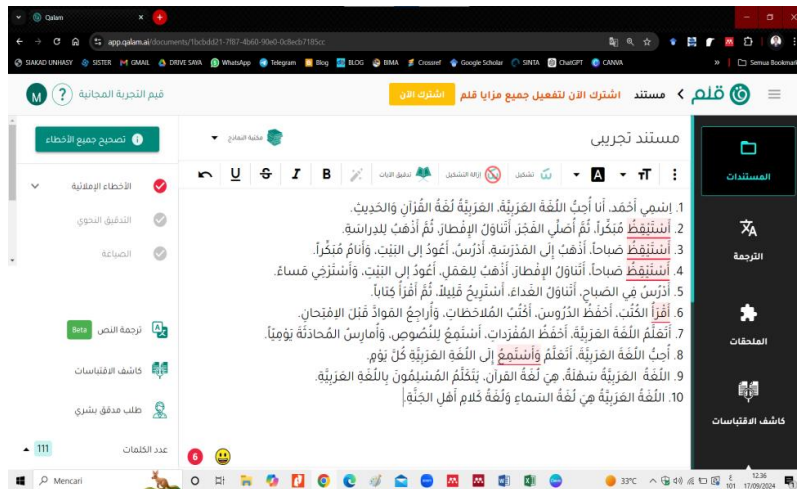


Figure 3. Results of Qalam AI Analysis on the Arabic Text

Fourth, Application of Language Teacher Competencies

The results of detecting students' reading through the utilization of Qalam AI were analyzed by the teacher's language competencies to further analyze the trial and error results from Qalam AI's analysis. This highlights the crucial role of human competencies in the utilization of artificial intelligence technology. As seen in Figure 3 above, some words in several sentences were highlighted in red and underlined. This occurred because Qalam AI detected them as fi'il madhi (past tense verbs) in the form of tsulatsi mazid (three-letter root words with additional letters), with three added letters being (hamzah, sin, and ta), such as استيقظ. However, this word is actually a fi'il mudhori (present tense verb) in the tsulasi mazid form with the subject "I," which becomes أستيقظ. Yet, Qalam AI detected it as a fi'il madhi (past tense verb). A similar issue occurred with the word "أستمع" (fi'il mudhori tsulasi mazid with the subject "I"), which Qalam AI detected as "أستمع" (fi'il madhi tsulasi mazid). This demonstrated that teacher competencies in Arabic remain necessary when used artificial intelligence in learning.

Fifth, Diagnosis and Placement

The results of the students' reading test, which have been analyzed through the integration of artificial intelligence and language teacher competencies, could be used to diagnose students' weaknesses in reading Arabic texts while also facilitating placement based on each student's intelligence according to their scores.

Sixth, Evaluation

The processes that have been carried out from the teaching and learning stage, reading skills tests on Arabic texts, utilization of Qalam AI, application of language teacher competencies, diagnosis and placement, need to be followed by an evaluation of the overall program or activities that have been conducted. This aimed to measure the extent of success in implementing learning and teaching based on the integration of artificial intelligence technology and language teacher competencies as evaluation instruments to assess students' skills in Arabic language learning.

CONCLUSIONS

Design of Integrating Qalam AI and Language Teacher Competencies in Evaluating Arabic Reading Skill" explored the innovative integration of artificial intelligence, specifically Qalam AI, with the competencies of language teachers to enhance the evaluation process of Arabic reading skills. The study emphasized the dual role of technology and human expertise, proposing a structured evaluation framework that includes stages such as utilizing Qalam AI for reading instruction, conducting reading tests, and analyzing results through teacher competencies. It highlights the necessity of teacher involvement in interpreting AI-generated feedback to ensure accurate assessments, thereby addressing the limitations of relying solely on technology. Ultimately, the research aimed to demonstrate how this integration could lead to more effective and responsive educational practices in Arabic language learning.

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