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The Role and Impact of AI-Driven Feedback Models and Applications in EFL Vocabulary Learning and Retention: A Systematic Review

Raja Muhammad Ishtiaq Khan,[1]* Muhammad Shahbaz[2], Raja Zahid Farid[3], Nouman Hamid[4]
[1]Department of English, College of Education, Majmaah University, Kingdom of Saudi Arabia
[2]Department of English, GC Women University Sialkot, Sialkot, Pakistan [3]College of Engineering and Information Technology Unaizah, Unaizah Colleges, Kingdom of Saudi Arabia
[4]Assistant Professor, Department of English, University of Azad Jammu and Kashmir, Pakistan

* Corresponding Author
Email: r.khan@mu.edu.sa
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ABSTRACT
Vocabulary learning is an essential aspect of language acquisition, and providing effective feedback on vocabulary instruction is key to achieving learning objectives, particularly in language education. A significant challenge in this area is vocabulary retention, which plays a key role in developing various language skills. This study aims to assess the role and impact of AI-driven feedback in EFL

vocabulary instruction within Islamic educational institutions. Using a systematic review method, the researcher examines various AI-driven models that can be integrated with E-learning to provide effective feedback. The findings indicate that these AI mechanisms can be integrated to enhance vocabulary learning and retention. Overall, the analysis suggests that well-implemented AI feedback models can create personalized learning experiences, ultimately improving students' vocabulary learning and retention.

Keywords: Artificial Intelligence, EFL, AI-driven Feedback, vocabulary retention, vocabulary learning

INTRODUCTION

Mastering a target language entails various factors, with vocabulary playing a crucial role, particularly in learning English as a Foreign Language (EFL). It facilitates global communication, especially in countries focused on Islamic education. Vocabulary serves as the channel conveying and understanding meaning, enabling Muslim students to communicate with the world and enhance educational collaboration (Khan et al., 2024). When EFL students have sufficient vocabulary, they can easily comprehend spoken and written language, as well as express themselves verbally and in writing (Ghalebi et al., 2020). The importance of vocabulary is evident in its impact on learners' language proficiency in both receptive and productive skills. Specified vocabulary is mandatory for holding conversations, accurately hearing what is being spoken, and comprehending a larger piece of spoken and written text. As e-learning reshapes educational practices worldwide, effective vocabulary retention has become increasingly vital for EFL learners. Traditional vocabulary instruction methods often lack the personalized support needed for long-term retention, especially in an era where learners are engaging with content remotely, with limited real-time feedback (Ali & Faisal, 2024; Li, 2023). Thus, developing more effective methods for vocabulary retention is critical, as these directly influence overall language proficiency.

Vocabulary influences various language skills, including listening, speaking, reading, and writing (Schmitt & Schmitt, 2020).

It is seen as an essential gateway in effective reading, as the knowledge of vocabulary memory facilitates the recall or retention of new information from hearing or reading. EFL vocabulary is approached from different viewpoints, particularly focusing on readers, spellers, and learners of English as a second language (Y. Feng & Webb, 2020). However, vocabulary knowledge is complicated due to three aspects, including focus, quantity, and quality (Nation, 2024). These aspects represent cognitive needs of attention that affect vocabulary learning. Vocabulary is best learned when there is enough contextualization and learners get the required feedback (Hwang et al., 2023).

The widespread use of computers and internet technology has had a significant impact on EFL learning in Islamic educational institutions, particularly in Indonesia (Al Arif & Handayani, 2022). As a result, the approach to learning has changed and evolved into e-learning. One of the most vital problems in e-learning is the lack of student feedback (Kibuku et al., 2020). Current methods, such as memorization and generalized feedback, are insufficient to support sustained vocabulary retention. In the absence of personalized and timely feedback, learners often fail to integrate new phrases into their active vocabulary, which impacts their fluency in communication. This challenge is even more pressing in non-English speaking regions where learners experience limited exposure to the language. Due to the lack of immersion and real-world practice, targeted instruction is required to achieve vocabulary retention.

The rapid adoption of e-learning platforms makes this research especially relevant, aligning with the global shift toward digital learning. As technology continues to evolve, understanding how AI-driven tools can help overcome retention obstacles will ultimately enhance the effectiveness of e-learning for language acquisition. Recent studies (Feng et al., 2023; Li, 2023; Wei, 2023) have noted the potential impact of feedback in EFL learning, yet the area of AI-generated personalized feedback for vocabulary retention remains largely unexplored. This research focuses on how AI can provide immediate, adaptive, and context-specific responses,

thereby filling the gap in the extensive use of this technology within EFL learning.

Language comprehension and communication rely on a solid foundation of vocabulary retention. Students with extensive vocabularies tend to find reading material easier to understand, express themselves better in writing, and speak more fluently and confidently (Akmalovna, 2024; Khan et al., 2024). Consequently, vocabulary retention is an important element for linguistic development. This study emphasizes the significance of AI-driven feedback methods and their role in vocabulary retention, which seems to be a key component sustaining all levels of language proficiency.

Intelligent Tutor Systems (ITS), chatbots, and AI learning platforms can offer personalized vocabulary tasks, provide instant feedback, and diagnose errors as they occur. Platforms such as *Duolingo* and *Memrise* use AI to cater to individual learners' needs. They enhanced vocabulary retention among their students, demonstrating success without versatility in teaching approaches. AI-generated feedback is not constricted to systematic templates; instead, it generates feedback that is specific to students' progression. Through this innovation, students are guaranteed instant and relevant recommendations, capturing what they currently know and their preferred learning methods. While many studies (Guo, 2021; Kuo et al., 2014; Mousavi et al., 2020; Nakata, 2015) have emphasized the role of feedback in language learning, few have explored the integration of AI technologies for personalized, real-time vocabulary support, which is a crucial element for enhancing retention.

Vocabulary learning is an indispensable part of language development, directly impacting learners' proficiency in communication, comprehension, and writing. Engaging in these activities requires learners to interact meaningfully and demonstrate skills in both social interactions and academic situations. Traditional vocabulary learning techniques often rely on conventional methods with minimal feedback, which can hinder retention and overall learner development over time.

The advancement of technology, particularly through Artificial Intelligence (AI), has transformed the teaching and learning of foreign language. AI-driven feedback models and applications provide unique, instant, timely, and relevant responses, facilitating greater learners' participation in vocabulary instruction. This technology can analyze learner performance, provide corrective feedback, and foster active learning systems that traditional methods cannot achieve. Effective feedback in foreign language vocabulary learning contributes significantly to language proficiency, which plays a pivotal role in determining success during one's studies and future careers. English language learning is particularly notable for adapting to global trends, resulting in its widespread use in non-native speaker environments (Wen et al., 2024). Research indicates (Enayat & Derakhshan, 2021; Hashimoto, 2021; Schmitt & Schmitt, 2020) that while English has the largest number of words among European languages, it has the second smallest vocabulary size. A solid foundation in vocabulary can support knowledge construction and promote skill development in the long term (Von Rueden et al., 2021).

Feedback mechanisms should consider the natural characteristics of human learning and provide essential support for English vocabulary enhancement. Effective feedback can bolster student confidence and promote intelligence. It can help keep students on track, identify areas of weakness, and provide appropriate strategies to overcome those challenges. Furthermore, it promotes reflective practices and facilitates progress in learning. Teachers can also utilize feedback data to diagnose collective learning problems in the classroom and deliver targeted instructional interventions, thereby enhancing communication with students and organizing a more dynamic learning environment to stimulate enthusiasm for learning. Additionally, teachers can incorporate real-time interactive feedback in the classroom by establishing robust connections with appropriate technological tools.

This research focuses on the role of AI-enabled feedback tools in enhancing vocabulary retention among EFL students. The main

purpose of this study is to review the efficacy of AI-driven feedback methods in advancing vocabulary learning and retention among students. A major impediment faced by EFL students from Islamic educational institutions' background is their limited opportunities to engage with the English language in everyday contexts, particularly when compared to their counterparts studying in English-speaking countries (Chowdhury, 2024).

In a data-driven educational landscape, technology can assist EFL students in learning vocabulary through numerous tools, with language educators benefiting from these advancements to facilitate vocabulary learning. Among the various EFL digital learning platforms, mobile applications have been well developed and commonly used due to the proliferation of smartphones within Islamic educational institutions (A. Ali et al., 2022; A. Ali et al., 2023; Khan, 2022). Nevertheless, while EFL mobile applications primarily support student learning, they often do not address the assessment process effectively. The necessity to evaluate students' learning outcomes remains a critical concern. Basic assessment methods often rely on vocabulary quizzes, yet the creation and evaluation of such quizzes requires effort.

The rise of language models, distributed word representation algorithms, and the availability of extensive corpora have enabled the development of new levels of computer-assisted language learning applications, including those designed for vocabulary quiz assessment. An AI-driven tool can analyze individual learning grades and provide personalized feedback to EFL students at various proficiency levels, assisting them in achieving their learning goals (W. Alharbi, 2023). Our review emphasizes several important issues that remain unexplored. Notably, there is a dearth of empirical research focused on the recent advancements in AI technology and its impact on sustained vocabulary retention in Islamic educational institutions, particularly in the context of Pakistani educational institutions. Such studies are required to ensure that learners can gain the benefits of modern technology greatly. In addition, we found a lack of comparative analyses that examine the efficacy of different models of AI feedback across

various educational and cultural settings, particularly regarding the rule-based and machine learning components of each model. Finally, there has been insufficient exploration of learners' perceptions, user engagement, strategies for observing feedback interfaces, and other active cognitive processes related to AI, thereby amplifying the gap in understanding how these technologies affect engagement and facilitate learning.

RESEARCH METHODS

A literature review method was employed to gather information on the intersection of AI and vocabulary. This systematic review utilized a qualitative research approach to interpret the findings. To ensure a comprehensive and systematic exploration, the literature search was conducted across multiple electronic databases, including *PubMed, Scopus, Web of Science,* and *Google Scholar*. The search strategy included combinations of relevant keywords and Boolean operators specifically tailored to the topic of this review. The keywords included vocabulary learning, AI, and vocabulary, AI and feedback, and AI and vocabulary retention. The search was restricted to peer-reviewed articles published in English between 2017 to 2024. Initially, a total of 104 articles were identified.

Articles were included in the review based on the following criteria: they focused on vocabulary and AI, examined feedback in vocabulary learning, presented original research, systematic reviews, or meta-analyses, were published in peer-reviewed journals, and were accessible in full-text. Studies not published in English, articles lacking a clear focus on the review topic, as well as conference abstracts, book chapters, or unpublished manuscripts, were excluded. After applying the inclusion and exclusion criteria, 31 articles were selected for detailed analysis.

RESULTS & DISCUSSION

Following the selection of the article, the results are categorized on several criteria, including vocabulary retention, an

AI-driven feedback mechanism, comparisons with traditional feedback, challenges associated with AI integration, teachers' readiness, and ethical concerns. The findings of the systematic review are discussed under the following headings.

Understanding Vocabulary Retention in EFL Students

The ability to express oneself fluently in English, both verbally and in writing, constitutes a valuable skill. It serves as an important asset in terms of employability. The pace, scale, and exceptional complexity of the language learning process often create challenges for language learners, leading to numerous difficulties in learning, acquiring, and retaining vocabulary. In the context of the EFL classroom, vocabulary retention is widely acknowledged as a major learning challenge, due to increased expectations for participants to have an accurate, native-like command of an expanding vocabulary (Barclay, 2021). The impact of vocabulary acquisition and retention is evident in students' classroom performance as well as their results on standardized test scores.

The process of vocabulary learning is crucial and demanding, which complicates efforts to promote and sustain long-term retention of new language among students, especially in classrooms where language exposure is distributed across diverse subjects and teaching formats (Hestiana & Anita, 2022; Khan et al., 2021). To enhance vocabulary attainment, the selection of teaching tools must be purposeful and efficient. The associate activities must be engaging, adaptable to the specific needs of the students, and centered on a student-centered approach. Recognizing the fundamental role that language acquisition plays in the development of multilingual citizens necessitates a commitment to examining the most innovative research advances in computer-assisted language learning and digital learning.

Key information was extracted from each included study, including authors, the year of publication, study design, objectives, methodologies, key findings, and conclusions. A data extraction template was constructed to developed to ensure consistency. Extracted data were synthesized qualitatively, focusing on identifying patterns, trends, and gaps in the literature. Where

applicable, quantitative data were aggregated and summarized. The findings from the literature review are elaborated under the following headings.

AI-Driven Feedback Mechanisms

AI is capable of providing human-like feedback in numerous ways (Kuddus, 2022). This study examined the effects of three AI-driven feedback mechanisms designed to improve vocabulary learning for EFL students: Automated Hints, Peer Discussion Forums, and Sentence-Level Feedback. Each mechanism focuses on a different strategy: Automated Hints give in-situ hints according to the current task, Peer Discussion Forums elicit attention to language and foster collaborative language practice, and Sentence-Level Feedback assists learners when they are unsure how to initiate a task.

AI-powered educational systems employ automated hints to provide targeted assistance to learners without direct human intervention, which can enhance feedback mechanisms in Islamic educational countries. These hints are generated based on the learner's current progress, common misconceptions, and typical error patterns. AI algorithms analyze the learner's responses and behavior to offer personalized suggestions, explanations, or prompts that guide them towards the correct solution. Automated hints have demonstrated particular efficacy in subjects such as mathematics and programming, where step-by-step problem-solving is crucial (Al-Badi & Khan, 2022). By presenting timely support, these systems aim to engage students and promote independent vocabulary learning while alleviating the cognitive load of EFL teachers from an Islamic educational background. Automated hints serve as a form of cognitive scaffolding, providing temporary support structures that help learners bridge the gap between their current understanding and the desired learning goals. These hint systems adapt to individual learner needs, adjusting the difficulty and specificity of hints based on the learner's progress and proficiency. Some automated hint systems also integrate metacognitive prompts, encouraging learners to reflect on their problem-solving strategies and thought progressions.

Automated hints are often a key component of Intelligent Tutoring Systems (ITS), which aim to provide personalized teaching and feedback at scale.

Cooperative learning environments can be effectively facilitated by AI-enhanced peer discussion forums in virtual and blended learning settings, requiring less effort on the part of teachers. These learning platforms act as a natural processing and machine learning algorithms to analyze student posts, identify key topics, and group similar forums. AI can also propose relevant threads to students based on their learning progress and interests, thereby fostering more meaningful interactions and various forms of words (Chiu et al., 2023).

Additionally, AI mediators can monitor the words used in discussions for inappropriate content, ensure adherence to academic integrity, and prompt further exploration of topics when discussions become inactive. By employing AI in peer forums, educators can create more dynamic and inclusive learning communities that extend beyond the traditional classroom boundaries, especially in Islamic countries, where learners can benefit from AI-based feedback. AI-powered forums can employ sentiment analysis to gauge the overall tone and emotional content of discussions, helping to identify potential conflicts or areas of high engagement. Advanced AI techniques, such as topic modelling, can automatically categorize and summarize large volumes of forum posts, simplifying navigation for both students and teachers to navigate discussions. AI can analyze the patterns of interaction within forums to identify influential participants, isolated learners, or emerging communities of practice (Schmidt & Strasser, 2022). Consequently, this approach can enhance learners' vocabulary size and depth across various backgrounds, levels, and themes. AI-assisted tools can rigorously evaluate the quality and depth of discussion forums, evaluating features such as critical thinking, argumentation, and evidence-based reasoning.

AI-driven sentence-level feedback models deliver a detailed and granular analysis of written work, offering suggestions for improvement at the most essential level of structure (W. Alharbi,

2023). By leveraging progressive natural language processing techniques, these models evaluate grammar, syntax, vocabulary usage, and stylistic elements. Additionally, AI-powered sentence-level feedback can also adapt to different writing styles and genres, providing tailored suggestions that align with specific academic or professional requirements. These systems use syntactic parsing to break down sentences into their grammatical components, enabling detailed analysis of sentence structure. They can assess the complexity and appropriateness of vocabulary usage, recommending more advanced or contextually suitable alternatives. AI can also appraise the logical flow and connections between sentences, identifying areas where transitional phrases or cohesive devices may be needed. Cutting-edge AI feedback systems can perform stylometric analysis, offering insights into vocabulary learning styles and consistency.

AI technologies deliver three kinds of feedback to support vocabulary learning, which can also be applicable for other learning fields. The first type includes automated assessments of answers to vocabulary-related questions, helping track progress and gauge the learner's understanding. The second type is personalized suggestions specifically tailored to assist individual learning challenges, catering to the unique needs and challenges of each learner. The third type features an interactive dialogue that facilitates ongoing discussions focused on learners' language challenges in real-time. This dynamic interaction allows for immediate support and guidance, ensuring that the learner receives timely aid when facing difficulties. The key distinction among these types lies in the methods by which they are delivered.

The first type of feedback, automated assessments, requires the least effort from the user (Paiva et al., 2022). In this situation, the AI-driven feedback is mechanically pushed to learners based on their communications with AI tools. The learner's progress is evaluated, and feedback is delivered impeccably without necessitating any supplementary input from the user. This approach may also be beneficial for EFL teachers from an Islamic educational background. The second type, interactive dialogue, represents the

most intensive kind of interaction between the learner and the AI. This method necessitates initial input from the learner to ask questions, assign tasks, clarify language use, and provide comprehensive support. Such interaction ensures a deep engagement with the learning material and promotes active participation from the learners. While automated evaluation tools are commonly accessible and applicable across various learning contexts and subjects, AI systems that focus on feedback often vary; there are some that predominantly emphasize automated assessments, while others prioritize interactive dialogue. It is quite rare to find AI systems that efficiently integrate both types of feedback categories.

To improve the learning experience and optimize vocabulary acquisition, feedback generated using Natural Language Processing (NLP) can be more adapted based on contextual information derived from the user input (Alatrash et al., 2022). This adaptive approach ensures that the feedback is personalized to the learners' specific background and facilitates a more customized learning experience. In certain learning situations, especially those that require a comprehensive and multifaceted approach, the blend of multiple feedback types proves to be the most effective in developing Islamic countries, for instance, Pakistan. By integrating mechanized assessments, personalized suggestions, and interactive dialogue, learners can benefit from a multi-level feedback system that caters to their individual needs, monitors their progress, and provides timely support. The integration of technology in vocabulary learning covers a wide range of possibilities, accommodating numerous learning preferences and offering diverse pathways for learners' language skills advancement.

Feedback mechanisms are essential from a cognitive psychology perspective during the lexicographic knowledge acquisition process. In the context of intercultural intelligence didactic knowledge transfer, these mechanisms are mainly activated through learning communicative strategies to avoid or solve problems at the semantic and syntactic levels of language in Islamic background institutions. For communicative strategies used during

lexicographic didactic knowledge acquisition supported by AI, different feedback types are designed to prevent the possible harmful effects of AI-driven tools, such as belief updating and AI dependency. In general, interfaces featuring different feedback options, such as question-and-answer communities, discussion forums, virtual tutors, and embedded quizzes, are preferred by L2 learners over traditional types of learning feedback.

Comparison with Traditional Feedback Methods

When discussing detailed applications, it is important to compare the results achieved with the reviewed methods to those achieved by the traditional methods. In this section, we consider various traditional approaches in more detail. Using word cards or other rote memorization methods often limits the teacher ability to control the progress of individual students. This drawback remains even if a teacher controls the learning pace and repertoire. In addition, students may become bored and disengaged from the learning process as a result of using rote memorization methods (Wen et al., 2024). Input flooding is just a standard teacher-led course where teachers use traditional vocabulary learning methods. Few studies have quantified the differences in student learning and attitudes between input flooding and individualization. The feedback in Islamic countries is mostly done either verbally or in written form on notebooks in EFL classrooms. The inclusion of AI feedback can help EFL instructors to use the advanced-level feedback mechanism.

To begin with, we should look at the following metrics: learners' motivation to complete tasks, the waiting time between learning and applying the vocabulary, the rate of forgetting of studied vocabulary, revision habits after lessons, and the number of words students can retain. It is essential to keep the waiting time between learning vocabulary and its application as short as possible to ensure learners remember the meanings of the new words. AI can assist in this by prompting the learners to apply the studied vocabulary immediately after the lesson. Furthermore, AI can provide immediate feedback upon task completion. In an input-flooding classroom, delivering feedback can be challenging.

Research shows that AI feedback, whether based on affect or estimation, is as beneficial as corrective feedback. People with long waiting times are more likely to forget than those with short waiting times because memory retention degrades quickly in a few hours. If learners plan to apply newly learned words next Monday, we cannot expect a strong retention rate.

AI-driven systems are expected to have many advantages over traditional feedback methods. Firstly, the ability to assist a large number of students through an AI-driven feedback system could significantly change the landscape of language learning and teaching (Nykyporets et al., 2024). Personalized learning, that is, adjusting study to each student, is the main issue of language education. However, a teacher can't lead personalized education for 200 students at the same level. An AI system, on the other hand, can offer nearly individualized education to each of the 200 students while maintaining a common teaching strategy. In language learning, immediate feedback is a key point. Learning vocabulary involves making mistakes. If there is no one available to correct these mistakes, they may become part of the learning process. Access to immediate feedback also enhances motivation, allowing students to check whether their answer is right or wrong. Students could abandon ineffective routines that block their development.

Moreover, an AI-driven feedback system can be developed adaptively in EFL educational institutions in Islamic countries. This system can analyze human interaction records to determine the most effective form of feedback for each learner and identify the specific level at which a successful and satisfactory lesson is achieved for each learner. Another advantage of AI systems is the capacity to record behavior and all the data related to an interaction (Etaat, 2024). While teachers may manually record a few cases after hard work, but only an AI model could gather data about thousands of interactions and deduce information and suggestions based on that. On the other hand, the contemporary learning process is interactive; it means that the more the learner is engaged, the more and better they learn. The AI tools under consideration are designed primarily to appeal to students and motivate them to make use of

them. All tools developed mainly for vocabulary learning contain two important instructions: the tools are based on interaction to improve motivation and vocabulary learning, and they are intended for pedagogical rather than scientific applications.

Challenges in incorporating AI

The challenges related to practical issues encountered when implementing AI technologies are numerous, and continually evolving. The practicalities of implementing new tools, the availability of these tools within existing curricula, and the adaptability of established systems and processes to effectively incorporate new technologies in Islamic educational institutions. Notably, the majority of EFL institutions in Pakistan lack the appropriate frameworks for E-learning pedagogy. Additional concerns are centered on the technology itself and focus on its consistency, reliability, and interpretability (Jomaa et al., 2025). These fundamental considerations must inform any critical evaluation of AI technologies.

Regarding the implementation of new tools, a range of concerns is raised by education research, which generally supports the incorporation of new and blended learning technologies. These concerns are mostly centered on the preparedness of educators and the compatibility of educational systems with technology-based adjuncts. Educators often express concern about their access to training commensurate with the affordances of new tools. The affordances of the technology are its inherent utility: what it does and how it integrates with current learning structures. Teachers are more inclined to use a new tool if they perceive it as compatible with their previous practices. Conversely, if a mismatch exists, a new tool may be considered potentially risky, as it forces a radical change in pedagogical stance and instructional approach.

Technical Limitations

The use of AI based on natural language processing (NLP) in the teaching of vocabulary has the potential to support learners by helping them find words that match their writing style and meaning by providing possible suggestions, or by ensuring that they only

receive suggestions at a specific level of text difficulty. However, there are several technical challenges related to using AI in educational technology tools. In particular, the technical quality of AI in Pakistani educational institutions can directly influence these educational or teaching applications. For example, AI systems may misinterpret learners' texts and suggest words that do not have the same meaning, making the learner's writing harder to understand, or make poor word predictions to hinder language learning. Additionally, systems may correctly predict a word that fits one learner's context, leading to a mismatch with the learners' needs.

It is worth noting that many researchers report annual improvements in AI and NLP technologies. As these technologies continue to develop, it is necessary that models need to be continually advanced to bring them into line with the latest linguistic resources (Ngo, 2024). Furthermore, despite being a practical rather than a technical consideration, careful attention must also be given to the design of the user interface in terms of aesthetics, as well as the ergonomics and accessibility of the tool. End users need to be able to easily understand and interpret the information they are presented within the interface. Finally, implementing an AI vocabulary teaching platform requires substantial resources, and ongoing funds will be necessary for maintenance and upgrades.

Teacher Readiness

The practical readiness of EFL teachers from an Islamic educational background to use AI tools is essential. Evidence shows that providing teachers with professional development related to AI tools for vocabulary teaching makes a difference (K. Alharbi & Khalil, 2023). While there have been some concerns that AI will replace teachers in some aspects of their work, overall, teachers tend to have an optimistic attitude toward the use of AI. For AI to be integrated into regular language teaching, it is important to provide support such as mentoring, particularly in teacher training. Addressing educators' fears regarding the use of AI assessment and other specific issues is also important. Our findings align with previous research, showing that many interested teachers function

as advisors, find AI-related tools and practices potentially useful, but are not yet familiar with AI (with some exceptions). They also believe they need significant skills to create their own AI-based activities or adapt existing resources.

A lack of specific AI terminology or basic familiarity with AI has been reported as an issue in our work to date. Therefore, we have created a training intervention that does not require a high level of AI literacy. During the questionnaire stage, a number of teachers expressed the need for ongoing support to help them use AI tools to create their own resources. Expert teachers want more freedom and are less pessimistic about AI. For AI integration to succeed, teachers must be prepared to take advantage of AI technology.

Ethical Concerns

AI can offer personalized learning opportunities for children, but current developments are characterized by uncritical excitement about the potential of the technology and dominant corporate narratives (Mohamed, 2024). Even though AI is not yet widely implemented in individual schools, most students will have some interaction with AI through media and platforms. As AI systems advance, we need to consider how these systems interface with current school learning practices. This raises important concerns regarding the use of AI in classrooms in general and specifically in vocabulary teaching. While it is recognized that AI technologies are speculative and changing, we discuss some practical and ethical issues that are important to consider when these systems are implemented.

One significant area of concern is data privacy. Collecting clean, bespoke data is fundamental to the functioning of many AI systems in educational settings (Huang, 2023). The rapid generation and analysis of big data helps create sophisticated, learner-centered systems. However, this gathering and curation of big data on students are often done at the cost of student privacy and should be flagged as a point of concern. Educational institutions should be transparent to students and parents about what data is collected, how it will be used, and how long it will be stored. When

discussing about informed consent, we need to think about whether digital rights should be based on individual consent to opt in or opt out, or whether there is a collective right to data privacy that should be protected. Another crucial area of concern is content bias. Like in the case of algorithmic bias, the data fed into AI systems can be reflective of patterns in the real world where some groups' experiences overshadow others or are simply not present. AI systems can then produce content, such as vocabulary lists or word associations, that reproduce this bias.

Any AI solution aimed at personalization will need to collect and analyze data on students' vocabulary learning, which raises significant ethical issues. Data on individual or group performance on learning tasks, particularly in an educational setting, can reveal sensitive information. Additionally, algorithm bias is another potential ethical issue in AI technologies. Bias in AI or algorithms can arise from the dataset used for training an algorithm (Qizi, 2023). If a large dataset contains far more examples of certain groups of people than others, the resulting algorithm trained on this dataset is more likely to produce a skewed result for underrepresented groups with less training data. It is thus paramount to evaluate rigorously the outputs of AI systems developed for language teaching and identify possible biases. Furthermore, teachers need to understand how AI algorithms work, particularly how natural language processing and deep learning algorithms and models achieve their outcomes in teaching written language.

Benefits of AI-Driven Feedback in Vocabulary Retention

With the advancement of Artificial Intelligence (AI), the methods of teaching and learning languages have improved. For example, the AI features within tools such as GPT can personalize learners' writing and reading materials according to their individual needs in Islamic educational institutions. One notable benefit for language learners is the assistance AI provides in education is the assistance it provides them in remembering and learning new vocabulary. Based on academic and empirical evidence, this essay will present a plethora of data supporting this claim, identify the

methods AI uses to improve vocabulary retention, explore the benefits it presents, and highlight the obstacles it faces.

AI can help EFL learners in Islamic countries with vocabulary retention through various methods, including the use of placement tests and adaptive learning algorithms. These measures set learners at the appropriate level, ensuring that instruction is neither too easy nor too difficult. Tools like Duolingo and Memrise use spaced repetition algorithms (SRA) to help learners retain vocabulary through frequent presentation. Reviews of vocabulary aim to be at the right interval to retain them effectively, endorse the curve theory (Ebbinghus, 1885). Words that learners struggle with are presented more often, while mastered words appear less frequently. Additionally, AI can analyze certain patterns in learners' behavior to identify specific areas for improvement and provide contextual feedback using NLP.

AI-driven feedback mechanisms come from intelligent systems or smart technologies such as computer programs, applications, gadgets, or tools. The more innovative these solutions are, the higher the engagement and enhancement of practice, and retention. Specifically, computers can be programmed to assess the correctness of vocabulary usage of EFL learners and provide prompt feedback. However, the feedback process from most reading systems designed for EFL students has yielded controversial outcomes. While some studies assert that these computer programs or platforms are proven to improve EFL students' vocabulary retention and language performance, others argue that their benefits are not clear.

In addition, in the context of practice, EFL students prefer a personalized learning experience, which can be achieved through intelligent feedback. This feedback provides tailored suggestions based on the individual performance of EFL students from Islamic countries. The flexibility in time and location means EFL students can access learning opportunities to acquire new vocabulary whenever and wherever they are available. AI-driven feedback mechanisms provide EFL learners with the extra time to practice

novel words, increasing both frequency and length of exposure to language (Etaat, 2024).

Hence, after regular and extended word training interactions, those underperforming students would have better chances of achieving their vocabulary goals. Therefore, teachers should focus on the roles of AI-driven feedback mechanisms in enhancing vocabulary retention when developing computer-supported learning for EFL students. Mindful strategies need to be employed during their instruction to ensure appropriate amounts of contact and review of words at different levels of difficulty. Once the technology has been developed, it is essential to evaluate the effectiveness of these strategies in accelerating vocabulary learning outcomes for the majority of students they serve.

Practices for Implementing AI-Driven Feedback Systems

Educators can adopt certain practices to ensure they maximize the effectiveness of AI-driven feedback systems. This can be explained in a logical framework, with certain key actions and supporting tools serving as prerequisites for successful and rewarding outcomes worldwide, particularly in Islamic countries. To begin with, the highest level of instruction takes the form of guidelines. These guidelines encourage students to take personal control of their learning. Students need to understand the nature and potential benefits of AI applications within their learning space. Questionnaires can be useful for assessing students' level of motivation and prior knowledge. This information can help identify student knowledge gaps and measure how effectively these gaps are addressed over time.

Implementing a guidance protocol is mandatory for implementing AI-based feedback in EFL institutions in Islamic countries. After establishing the guidelines, educators should compile a set of underlying learning resources, including EFL vocabulary tailored to meet the specific requirements of each learning level. With a resource pool in place, the associated AI-driven feedback systems can then be built (Yablonsky, 2020). Before activation, it is advisable to test these systems with a team of experts to evaluate their effectiveness in generating feedback. These

evaluations, combined with a user trial tool, will fine-tune the system for full use by the targeted users. Once operational, AI-driven feedback generates data that can be served at observation points, informing subsequent educational actions. Nevertheless, it is important to monitor for feedback adequacy and learning outcomes. With these prerequisites established, teachers can finally utilize the AI feedback mechanisms in association with practical application instruction. Survey should be conducted before and after lessons. The AI output can be matched against actual learning outcomes and will be evaluated (Chiu et al., 2021). Finally, students will assess their results not just based on AI feedback, but also considering their performance, enjoyment, and the relevance of the learning process.

Integration with Existing Learning Platforms

As we aim to leverage AI and computational feedback as integral aspects of the language learning process and not an isolated component, it becomes necessary not to isolate the SDLF system either from the end users' perspective. This extends to the seamless integration of such AI-driven applications with existing learning platforms. To achieve this, we can take advantage of well-established Learning Management Systems (LMS). When we talk about integrating AI-based, into certain systems, we at least require that a commercial license is available to use our educational software within the frameworks of these popular systems. In this work, we made this goal feasible.

By opting for any of the integration pathways, the affiliated educational institute can offer high-quality language challenges to the students or learners while maintaining control over the challenge content and, in addition, gain access to pedagogically relevant learning analytics that are made available. AI-based vocabulary learning methods leverage machine learning algorithms and natural language processing techniques to enhance language acquisition (Kuddus, 2022). One effective model is adaptive spaced repetition, where AI algorithms analyze a learner's performance and optimize review intervals for each vocabulary item, ensuring efficient long-term retention (Zhang et al., 2022). This approach

personalizes the learning experience by tailoring the frequency and timing of word reviews to each individual's needs, maximizing retention while minimizing study time. In a typical higher education institution, the choice of LMS happens only once every few years. Although these learning platforms offer extensions platform to develop custom educational add-ons to the base application, supporting all three seems to be a significant investment in terms of time and energy.

The results of this review indicate that there are clear benefits to using AI-based feedback systems compared to traditional feedback tools, especially for EFL learners from various backgrounds, including those from Islamic institutions. One of the main advantages of AI is that feedback can be done on a large scale with many students simultaneously (Nykyporets et al., 2024). This technological feature transforms language learning by solving one of its biggest problems: personalized learning. Instant feedback is also a key benefit provided by AI-powered feedback systems. Mistakes are an unavoidable part of language learning, particularly in terms of vocabulary acquisition. If these errors are not corrected promptly, they can become entrenched in the learner's knowledge base. AI-based tools provide real-time feedback that allows learners to spot and fix errors immediately, which reinforces correct usage and prevents internalizing mistakes. Moreover, through instant feedback, AI-based systems help boost motivation and engagement since students get immediate validation of their advancement.

Additionally, feedback systems powered by AI are adaptive, improving how they give feedback through interactions with users. This flexibility enables AI tools to analyze what forms of feedback are most impactful for specific learners, customizing their instructional approaches as appropriate. This is relevant for finding the right skill level for every student, in order that he or she can learn successfully and enjoyably. Such flexibility is harder to achieve in conventional classroom settings, in which teachers must depend on collective scaffolding, i.e., a one-size-fits-all approach to instruction.

Another significant advantage to AI-driven feedback systems is their ability to collect and analyze data effectively. While human educators often physically jot down a maximum of engagements, AI models can routinely log, analyze, and provide useful insights from their massive pool of interaction data (Etaat, 2024). Through complex data analysis, AI tools can identify and improve pedagogical strategies based on deep, empirical data rather than instinct or anecdotal experience.

Lastly, the AI-based tools provide outstanding support for the interactive nature of modern learning. Research shows that the more engaged students are in their learning, the better they learn, and AI tools are engineered to be interactive and appealing to students. Many vocabulary learning apps driven by AI are specifically designed to boost motivation through engaging exercises. However, one must remember that these tools are strictly didactic, not scientific studies.

Therefore, AI-powered feedback systems are a revolutionary force in the realm of language acquisition, offering scalable, tailored learning, instant responses, an adaptive nature, and an analytical perspective. Such systems can be nicely used with the modern transition to interactive forms of learning, keeping learners actively engaged and motivated. Future studies should investigate how AI-generated feedback affects language learning over the long term, as well as the ethical implications of data gathering and personalized teaching.

CONCLUSION

The research has examined the application and impact of AI-based feedback models and applications in enhancing vocabulary learning and retention for EFL learners in Islamic educational institutions. The findings indicate that AI-based language learning software possesses tremendous benefits in language acquisition, providing instant, adaptive, and personalized feedback that traditional methods often lack in Islamic countries as compared to the other parts of the world. These technologies not only facilitate

learners to learn new words more effectively but also improve long-term retention through engaging and interactive learning environments. In addition, AI-based feedback tools enhance learner autonomy, motivation, and confidence, leading to more active and engaging learning experiences. The review also points out that although AI tools offer promising benefits, their effectiveness is highly contingent on proper implementation, instructional design, and teacher support.

Recent years have seen the rapid development of artificial intelligence that has direct relevance for providing learners with real-time automatic feedback in scenarios where it is currently not available, such as reading in a foreign language. Within this context, this paper sets out to highlight the potential impact of AI-driven feedback on EFL students' vocabulary knowledge retention in Islamic background EFL educational institutions. Results from the review indicate that AI-driven feedback, particularly intelligently timed feedback, can have significant benefits for EFL vocabulary retention. These findings suggest that the key to utilizing AI in learning environments is to design systems possessing qualities of intelligent timing, high contextual relevance, and proactive feedback. The review of the studies shows the potential role of feedback-fostering models in the field of vocabulary retention, and the results suggest that technology has significant promise in offering additional benefits to vocabulary retention for EFL students. Lastly, while the AI-driven feedback can indeed interact with dynamically generated in-text hyperlinks, in a real-world setting, their interaction may produce additional formative feedback information, which remains a potential avenue for future work.

Future research can harness technological advancements in the areas of natural language processing, information extraction, natural language generation, advances in artificial intelligence, mixed-reality environments, or adaptive learning systems and transfer the resulting technologies and innovative solutions to other areas, such as non-vocabulary related aspects of language learning and foreign language learning. As AI technologies continue to

evolve, there is considerable potential for creating more accurate language models that can precisely identify the potential problems students may face. It is particularly interesting to investigate which NLP tools present the best results in learning.

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