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## **Harnessing Gemini for Arabic Mastery: Educators' and Learners' Views**

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### **Abstract**

This study aims to explore the perspectives on the reliability of Gemini in Arabic language studies, supported by a comprehensive literature review for each segment. Adopting a qualitative phenomenological approach, the research focuses on examining the experiences and perceptions of academics regarding the use of the Gemini chatbot. The research population includes 120 students studying Quranic Sciences and Exegesis at STAI Al-Anwar Rembang, purposefully selected for their collective proficiency in the Arabic language. Additionally, 11 Arabic language teachers in Rembang are actively involved in developing a structured teaching framework enriched by Gemini. The result highlights the importance of collaboration among linguists, educators, and tech developers in leveraging Gemini, an AI tool, for effective Arabic language education, while addressing accuracy and privacy concerns. The researcher anticipates that this study will provide insights into integrating AI tools like Gemini into Indonesian curricula, enhancing Arabic language learning. It seeks to contribute to the discourse on technology-enhanced language education and its practical implications.

**Keywords:** *Google Gemini; Language Learning; Artificial Intelligence; Conversational Learning Chatbot; Reliability of Gemini*

### Abstrak

Studi ini bertujuan untuk mengeksplorasi perspektif mengenai keandalan Gemini dalam studi bahasa Arab, didukung oleh tinjauan literatur yang komprehensif untuk setiap segmen. Dengan mengadopsi pendekatan fenomenologi kualitatif, penelitian ini berfokus pada pengalaman dan persepsi akademisi terkait penggunaan chatbot Gemini. Populasi penelitian mencakup 120 mahasiswa yang mempelajari Ilmu Al-Qur'an dan Tafsir di STAI Al-Anwar Rembang, yang dipilih karena kemahiran kolektif mereka dalam bahasa Arab. Di samping itu, 11 guru bahasa Arab di Rembang dilibatkan secara aktif dalam mengembangkan kerangka pengajaran yang terstruktur dan diperkaya oleh Gemini. Hasil penelitian menyoroti pentingnya kolaborasi antara para linguist, pendidik, dan pengembang teknologi dalam memanfaatkan Gemini untuk menciptakan pembelajaran bahasa Arab yang efektif, sembari menyempurnakannya dari segi akurasi dan privasi. Peneliti mengharapkan bahwa studi ini akan memberikan wawasan tentang integrasi alat AI seperti Gemini ke dalam kurikulum Indonesia, sehingga dapat meningkatkan kualitas pembelajaran bahasa Arab. Studi ini bertujuan untuk memberikan kontribusi pada wacana tentang pendidikan bahasa yang ditingkatkan dengan hadirnya teknologi AI dan implikasi praktisnya.

**Kata Kunci:** *Google Gemini; Pembelajaran Bahasa; Kecerdasan Buatan; Chatbot Pembelajaran Percakapan; Keandalan Gemini*

### Introduction

The development of Artificial Intelligence (AI) has brought significant breakthroughs across various sectors, including the field of education.<sup>1</sup> In an era where the role of technology is increasingly crucial, challenges arise in addressing how we can optimize artificial intelligence to enhance the effectiveness of teaching and learning, particularly in the context of language education.<sup>2</sup> The application of artificial intelligence

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<sup>1</sup> Cecilia Ka Yuk Chan, "A Comprehensive AI Policy Education Framework for University Teaching and Learning," *International Journal of Educational Technology in Higher Education* 20, no. 1 (2023): 38, <https://doi.org/10.48550/arXiv.2305.00280>; Thomas KF Chiu et al., "Teacher Support and Student Motivation to Learn with Artificial Intelligence (AI) Based Chatbot," *Interactive Learning Environments*, 2023, 1–17, <https://doi.org/10.1080/10494820.2023.2172044>.

<sup>2</sup> Mahmoud Al-Ayyoub et al., "Deep Learning for Arabic NLP: A Survey," *Journal of Computational Science* 26 (2018): 522–31, <https://doi.org/10.1016/j.jocs.2017.11.011>; Amr M Mohamed, "Exploring the Potential of an AI-Based Chatbot (ChatGPT) in Enhancing English as a Foreign Language (EFL)

in language learning not only provides an innovative alternative but also opens new opportunities for designing more dynamic and adaptive learning experiences.<sup>3</sup> Through the utilization of this technology, the interaction between learners and the learning platform is expected to become more effective, personalized, and stimulating for learning interests.<sup>4</sup>

Chatbot AI like ChatGPT, Gemini, and Bing serve not only as one-way platforms for learning and teaching the Arabic language but also as collaborative tools.<sup>5</sup> This collaboration involves users in co-designing with AI how the conceptual framework aspects, application-practice aspects, and the evaluation of the learned Arabic language can become an integral part of their active learning development, both currently and in the future. The potential strength of AI chatbots is evident in their multifunctional use by the community.<sup>6</sup> Each platform has its subjectivity, characteristics, and unique advantages. One newcomer worth considering for language learning is Gemini, a conversational AI promising various advantages. With evolving technology, Gemini emerges as an intriguing alternative, offering an innovative language learning approach adaptable to users' needs. The

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Teaching: Perceptions of EFL Faculty Members,” *Education and Information Technologies*, 2023, 1–23, <http://dx.doi.org/10.1007/s10639-023-11917-z>.

<sup>3</sup> Davy Tsz Kit Ng et al., “A Review of AI Teaching and Learning from 2000 to 2020,” *Education and Information Technologies* 28, no. 7 (2023): 8445–8501, <https://doi.org/10.1007/s10639-022-11491-w>; Saeed Ahmed Mohamed and Mahmoud Ibrahim Alian, “Students’ Attitudes toward Using Chatbot in EFL Learning,” *Arab World English Journal (AWEJ) Volume 14* (2023), <https://dx.doi.org/10.2139/ssrn.4591887>.

<sup>4</sup> Chiu et al., “Teacher Support and Student Motivation to Learn with Artificial Intelligence (AI) Based Chatbot.”

<sup>5</sup> Salsabila Rheinata Rhamadani Putri Supriadi, Sulistiyani Usman Haedi, and Muhammad Minan Chusni, “Inovasi Pembelajaran Berbasis Teknologi Artificial Intelligence Dalam Pendidikan Di Era Industry 4.0 Dan Society 5.0,” *Jurnal Penelitian Sains Dan Pendidikan (JPSP)* 2, no. 2 (October 31, 2022): 192–98, <https://doi.org/10.23971/jpsp.v2i2.4036>; Ben Shneiderman, “Human-Centered Artificial Intelligence: Reliable, Safe & Trustworthy,” *International Journal of Human–Computer Interaction* 36, no. 6 (April 2, 2020): 495–504, <https://doi.org/10.1080/10447318.2020.1741118>.

<sup>6</sup> Mladjan Jovanovic et al., “Ambient Assisted Living: Scoping Review of Artificial Intelligence Models, Domains, Technology, and Concerns,” *Journal of Medical Internet Research* 24, no. 11 (2022): e36553, <https://doi.org/10.2196/36553>.

diverse features and capabilities of Gemini add a new dimension to the utilization of AI chatbots for language skills development.<sup>7</sup>

Integrating artificial intelligence (AI) into language learning raises critical questions about its wise implementation. Some scientists show enthusiasm for AI's potential, while others remain skeptical, highlighting trustworthiness as a major concern in its educational application. Learning Arabic with AI chatbot technology exemplifies this challenge practically. Southworth et al. stressed the importance of AI literacy across educational levels to prepare students for an AI-driven future, emphasizing its transformative impact on job sectors and daily life.<sup>8</sup> However, integrating generative AI like Gemini (formerly Bard) into education poses challenges such as accuracy, reliability, and ethical implications.<sup>9</sup> Gemini, despite its developmental stages, shows promise but also faces drawbacks like occasional inaccuracies and challenges in comprehension.<sup>10</sup> Addressing these issues is crucial for AI to effectively support learning environments by ensuring accurate data, fostering beneficial user relationships, and enhancing creative and informative capabilities. Continued research is essential to enhance AI's reliability and mitigate skepticism, thereby maximizing its positive contribution to education, particularly in contexts like Arabic language education where precision is critical.<sup>11</sup>

As a newcomer in the conversational chatbot world, there is still limited research exploring the extent of Gemini's reliability in data

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<sup>7</sup> Sundar Pichay, "An Important next Step on Our AI Journey," Google, February 6, 2023, <https://blog.google/technology/ai/Gemini-google-ai-search-updates/>.

<sup>8</sup> Jane Southworth et al., "Developing a Model for AI Across the Curriculum: Transforming the Higher Education Landscape via Innovation in AI Literacy," *Computers and Education: Artificial Intelligence* 4 (2023): 100127, <https://doi.org/10.1016/j.caeai.2023.100127>.

<sup>9</sup> Sundar Pichay, "An Important next Step on Our AI Journey."

<sup>10</sup> Bal Ram and Pratima Verma, "Artificial Intelligence AI-Based Chatbot Study of ChatGPT, Google AI Bard and Baidu AI," *World Journal of Advanced Engineering Technology and Sciences* 8, no. 1 (February 28, 2023): 258–61, <https://doi.org/10.30574/wjaets.2023.8.1.0045>.

<sup>11</sup> Nely Rahmawati Zaimah, Eko Budi Hartanto, and Fatchiatu Zahro, "Acceptability and Effectiveness Analysis of Large Language Model-Based Artificial Intelligence Chatbot Among Arabic Learners," *Mantiq Tayr: Journal of Arabic Language* 4, no. 1 (2024): 1–20, <https://doi.org/10.25217/mantiqutayr.v4i1.3951>.

augmentation and, in this case, delivering language learning materials with true precision. This simultaneously addresses the accuracy and bias issues commonly found in ChatGPT 3.5, encompassing an evaluation of the accuracy of information presented by Gemini and its ability to provide concrete and factual answers. Research can examine Gemini's responsiveness to various types of questions and their difficulty levels. To what extent can Gemini adapt to the needs of learners, especially in the context of Arabic language learning, which demands accuracy and often involves multi-topic challenges? Thus, this research aims to explore Gemini's augmentation and transformation in delivering Arabic language materials and frameworks.<sup>12</sup>

## **Method**

This phenomenological research delves into the perceptions of academics regarding the use of the Gemini chatbot in Arabic language learning. Encompassing 120 students of Quranic Sciences and Exegesis at STAI Al-Anwar Rembang and 11 Arabic language teachers in Rembang, the study aims to unravel their experiences with Gemini, emphasizing its reliability in Arabic language studies. Participants were selected based on several considerations, including their background in Pesantren (Islamic boarding schools), which provides them with a strong foundation in traditional Islamic education; their active engagement in the teaching and learning process as students and teachers; and their relative newness to using AI technology, which offers the potential to expand their access to practical teaching and learning tools and is expected to continue developing in the future. Purposive sampling ensures a diverse representation for a deep understanding within an Islamic educational context. The research method focuses on thematic exploration, steering clear of subjective analysis of Gemini's technical facets in the Information Technology realm. Data collection, through interviews and questionnaires, centers on learners' views of Gemini's reliability and qualitative responses to its application in the teaching framework. Analyzed phenomenologically, the research, spanning May to August 2023, aspires to unveil intricate patterns, providing comprehensive insights into the dynamics of Arabic language learning in an Islamic educational environment.

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<sup>12</sup> Imtiaz Ahmed et al., "ChatGPT vs. Gemini: A Comparative Study," preprint, June 22, 2023, <https://doi.org/10.36227/techrxiv.23536290.v1>.

The objectives of this research are divided into two sections, each represented by a research question. Research Question 1 (RQ1): What are the perspectives of academic practitioners and teachers on the use of Gemini as an Arabic pedagogical chatbot in line with the world's principle of AI-powered curricula? Research Question 2 (RQ2): How do practitioners in Arabic language education address the issues of accuracy and privacy as per the first research question by educators? These questions aim to explore the potential of AI in education, specifically focusing on the application of the Gemini chatbot in Arabic language teaching.

The study examines participant perspectives through three paradigms of linguistic taxonomy analysis. This taxonomy for linguistic research themes in analyzing participant perspectives covers several essential domains. The domain of Language Proficiency Development focuses on vocabulary acquisition, investigating everyday vocabulary and colloquial expressions learned through AI, alongside grammar and syntax, and analyzing sentence structure and morphology. This approach mirrors that used by Minhwa Lee et al.<sup>13</sup>, albeit in a writing context. Gathering participant perspectives solely through questionnaire sheets is challenging, necessitating supporting data, and interactive observations on each theme and sub-theme as utilized by Alwalls.<sup>14</sup> Transitioning to the Interactive Learning Experience, themes include engagement and motivation, examining participation in activities and motivational drivers, as well as adaptability and personalization, investigating AI's adaptive learning capabilities and personalized feedback.<sup>15</sup> Cultural and Contextual Understanding constitutes another domain, emphasizing cultural relevance and contextual usage, particularly AI's ability to teach idiomatic language and provide practical scenarios for real-life

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<sup>13</sup> Minhwa Lee et al., "Human-AI Collaborative Taxonomy Construction: A Case Study in Profession-Specific Writing Assistants" (arXiv, July 15, 2024), <https://doi.org/10.48550/arXiv.2406.18675>.

<sup>14</sup> Bakil Ali Alwalss, "Semantic Codability in Folk Taxonomy: A Cultural-Linguistic Perspective," *RumeliDE Dil ve Edebiyat Araştırmaları Dergisi*, no. 37 (December 21, 2023): 1224–38, <https://doi.org/10.29000/rumelide.1405997>.

<sup>15</sup> Sultan A. Almelhes, "A Review of Artificial Intelligence Adoption in Second-Language Learning," *Theory and Practice in Language Studies* 13, no. 5 (May 1, 2023): 1259–69, <https://doi.org/10.17507/tpls.1305.21>; Tahani N. Alruqi and Salha M. Alzahrani, "Evaluation of an Arabic Chatbot Based on Extractive Question-Answering Transfer Learning and Language Transformers," *AI* 4, no. 3 (August 16, 2023): 667–91, <https://doi.org/10.3390/ai4030035>.

application. Consequently, Teacher Support and Integration themes encompass instructional design, exploring curriculum integration and teaching resources, and teacher-student interaction, analyzing classroom dynamics and shifts in teaching methodologies facilitated by AI.<sup>16</sup> This comprehensive taxonomy offers a systematic framework for classifying and scrutinizing participant viewpoints on AI integration in Arabic language learning, ensuring a thorough grasp of its impact across diverse domains.

## **Result and Discussion**

### **Exploring Capabilities and Hurdles (RQ1)**

Embarking on the exploration of Google's Gemini in Arabic language learning involves traversing five distinct phases, each marked by a unique set of challenges and revelations. These phases encapsulate 135 examinations, scrutinizing AI's promises, questioning Gemini's impact, and delving into the intricacies of reshaping language models. It's a comprehensive journey, navigating through uncharted territories and evolving technologies, seeking a deeper understanding of AI's transformative potential.

#### ***Section 1: Daily Arabic Conversation***

In evaluating Gemini's performance, a survey was conducted to measure its reception in aiding participants' everyday conversations. The results were astounding, with 85% of respondents reporting a significant improvement in their ability to engage in informal conversations and, at the very least an increase in colloquial vocabulary. Gemini not only imparts conventional teaching through sentence structures and grammar but also introduces cultural and situational contexts that enrich participants' communication skills.

Gemini's responsive interface has played a central role in enhancing participants' abilities. Unlike conventional methods, Gemini provides a more personalized and adaptive experience. By adjusting the difficulty levels according to each participant's abilities, Gemini creates an environment that supports progressive language development.

Gemini not only facilitates technical learning of the Arabic language but also broadens participants' understanding of language

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<sup>16</sup> Chiu et al., "Teacher Support and Student Motivation to Learn with Artificial Intelligence (AI) Based Chatbot."



usage in everyday life. Through relevant conversation scenarios, participants can experience how language is used in real-life situations. This not only enhances speaking skills but also enriches their vocabulary with expressions used in daily life.

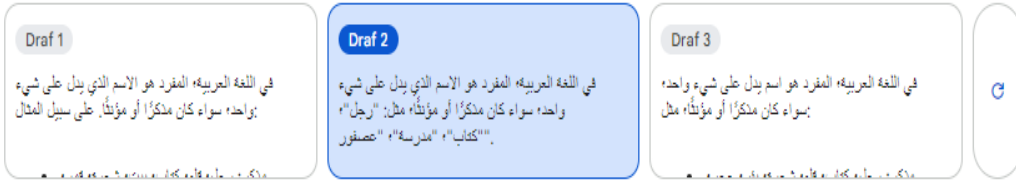
Furthermore, the positive response from participants is not limited to the improvement of language skills. Gemini also creates a fun and interactive learning atmosphere. This is reflected in the high level of participation in activities provided by Gemini, such as role-playing simulations, interactive dialogues, and word games. In this context, learning ceases to be a tedious task but becomes an engaging adventure.

### ***Section 2: Responding to the Instructions***

Direct interaction with Gemini through a microphone opens up space for authentic and contextual conversation practice. Participants reported that their confidence to speak in Arabic increased significantly because using the microphone gives a sense of direct communication. This creates a learning environment more akin to real-life situations, where participants can apply their knowledge in everyday conversation contexts (Figure 1). The importance of voice interaction in language learning is also reflected in the improvement of participants' listening comprehension. Through the microphone, Gemini provides the opportunity for participants to give instructions directly, related to predetermined topics in Arabic. This not only enhances interactive abilities but also trains participants to respond quickly and effectively in Arabic.

Although the majority of participants provided positive feedback, it is crucial not to overlook the technical challenges faced by around 10% of participants. Some reported constraints in voice recognition, where Gemini might struggle to understand specific vocal expressions or dialects. Additionally, some participants experienced response delays, which could impact their interactive experience. Therefore, there is a need for technical improvements in Gemini's voice recognition, assuming it is not due to device errors. Periodic updates and enhancements to improve accuracy in understanding diverse vocal expressions and Arabic dialects will significantly enhance the learning experience. Gemini's responsibility to respond quickly and accurately is also a potential focus for improvement.





في اللغة العربية، المفرد هو الاسم الذي يدل على شيء واحد، سواء كان مذكراً أو مؤنثاً، مثل: "رجل"، "كتاب"، "مدرسة"، "عصفور".

ويمكن تعريف المفرد أيضاً بأنه الاسم الذي لا يقبل الزيادة، أي لا يمكن تحويله إلى مثني أو جمع، مثل: "الله"، "الشمس"، "الماء".

وفي المنطق، المفرد هو اللفظ الموضوع الذي لا يقصد بجزء منه الدلالة على جزء معناه، سواء لم يكن له جزء، مثل: "أ"، أو كان له جزء ولم يدل على معنى، مثل: "زيد"، أو كان له جزء دال على معنى، ولكن ذلك المعنى ليس جزء المعنى المقصود، مثل: "عبد الله".

Figure 1. Examining Gemini in Arabic Materials

Beyond technical constraints, psychological and cultural aspects of using a microphone should also be considered. Some participants might feel awkward or hesitant to speak in a foreign language, even in a virtual environment. Therefore, a learning design that motivates and supports participants who may experience reluctance or confusion in interacting through a microphone is necessary.

### Section 3: Correcting the False Narratives

Gemini, as a tool for learning Arabic, receives significant praise for its ability to correct misconceptions effectively. One of its main strengths lies in providing clear and relevant explanations regarding the mistakes made by users. Gemini goes beyond mere correction; it assists participants in understanding the fundamental concepts underlying each error. This makes Gemini not just a corrector but also a mentor.

In a survey involving all participants, around 92% of them stated that Gemini's ability to provide constructive feedback positively influenced their understanding of Arabic language structure. This indicates that Gemini not only offers corrections but also functions as a learning resource that enhances comprehension of linguistic concepts. The clarity and accuracy of the narratives provided by Gemini are considered key aspects supporting the learning process. Participants feel that Gemini not only points out errors but also provides comprehensive information to help them understand why these errors occurred. This adds significant value to efforts to improve participants' understanding of Arabic language structure and rules.

Furthermore, Gemini's presence as a corrector and mentor also creates an inclusive and supportive learning environment. Participants feel more confident in correcting their mistakes because they know that Gemini focuses not only on errors but also on the learning process. This motivates participants to be more actively involved in using the Arabic language, seeing mistakes as opportunities to learn.

To ensure Gemini remains an effective tool, continuous attention to improving the quality of explanations and responses is necessary. Regular evaluations of participant or learner feedback can serve as the basis for further development, ensuring Gemini stays relevant and responsive to user needs. Furthermore, the integration of more extensive and sophisticated parameters and data can enhance Gemini's ability to provide more contextual and personalized feedback based on individual understanding levels. Thus, Gemini becomes not only a reliable corrector but also a personalized mentor tailored to the learning needs of each student.

#### ***Section 4: Building Translations, Interpretations and Explanations***

Evaluation of Gemini's ability to interpret Arabic phrases, especially idiomatic expressions, reveals a diverse picture from the participants' perspectives. A substantial 80% of participants provided positive feedback, stating that Gemini can deliver accurate and contextual translations. This indicates that Gemini successfully grasps the meaning of Arabic phrases, including expressions commonly used in everyday conversations.

However, approximately 15% of participants voiced concerns about Gemini's translation accuracy, especially in the context of complex expressions. They noted that at times, Gemini produces less precise translations, leading to potential confusion about the true meaning. Although the proportion of participants expressing these concerns is not dominant, it's crucial to understand that limitations in interpreting idiomatic expressions can pose a real challenge in learning Arabic.

To address this challenge, a thorough evaluation of the algorithms and databases used by Gemini is necessary. Continuous updates and improvements in translation content and models will enhance accuracy and contextual understanding, particularly when dealing with expressions nuanced with specific meanings in Arab culture. Additionally, involving Arabic language experts and gathering input from the user community in the improvement process can be an effective step in addressing inaccuracies.

Nevertheless, the diversity of feedback indicates that the majority of participants remain satisfied with Gemini's ability to interpret Arabic phrases. Ongoing advancements in technology and databases will further strengthen Gemini's capacity to provide more accurate and contextual translations. By understanding and proactively responding to diverse user needs, Gemini can continue to be an effective learning partner, especially in teaching the interpretation and use of idiomatic expressions in everyday Arabic language.

**Section 5: Constructing the Teachers' Frameworks**

Gemini has played a crucial role in helping build a framework for Arabic language teachers. Involving participants from eleven experienced teachers, their response to using Gemini has been overwhelmingly positive. They highlight the ease of integrating Gemini into the Arabic language classroom and provide valuable insights into how AI can be an effective ally in the teaching process.



موضوع الدرس	الأهداف التعليمية	الأنشطة التعليمية	التقويم	الموارد التعليمية
التعريف بالذكاء الصناعي	أن يعرف الطالب ماهية الذكاء الصناعي وأنواع خوارزميات الذكاء الصناعي الثلاثة الرئيسية: التعلم الخاضع للإشراف، والتعلم التعزيزي، والخاضع للإشراف، والتعلم التعزيزي.	أن يقرأ الطالب نصًا عن الذكاء الصناعي وأن يجيب على الأسئلة المتعلقة به. أن يناقش الطالب مع زملائه أنواع خوارزميات الذكاء الصناعي المختلفة وأن يعطي أمثلة عليها.	أن يجيب الطالب على اختبار حول تعريف الذكاء الصناعي وأنواع خوارزميات الذكاء الصناعي.	كتاب أو مصدر عبر الإنترنت عن الذكاء الصناعي.
استخدام الذكاء الصناعي في الترجمة	أن يعرف الطالب كيفية استخدام الذكاء الصناعي في ترجمة اللغات. أن يترجم الطالب نصًا من لغة إلى أخرى باستخدام أدوات الذكاء الصناعي.	أن يشاهد الطالب فيديو عن كيفية استخدام الذكاء الصناعي في ترجمة اللغات. أن يمارس الطالب ترجمة النصوص من لغة إلى أخرى باستخدام أدوات الذكاء الصناعي.	أن يترجم الطالب نصًا من لغة إلى أخرى دون استخدام أدوات الذكاء الصناعي وأن يقارن ترجمته بالترجمة التي تم الحصول عليها باستخدام أدوات الذكاء الصناعي.	برنامج ترجمة عبر الإنترنت.
استخدام الذكاء الصناعي في إنشاء المحتوى الإبداعي	أن يعرف الطالب كيفية استخدام الذكاء الصناعي في إنشاء المحتوى الإبداعي، مثل القصص والقصائد والكود. أن ينشئ الطالب محتوى إبداعيًا باستخدام أدوات الذكاء الصناعي.	أن يشاهد الطالب فيديو عن كيفية استخدام الذكاء الصناعي في إنشاء المحتوى الإبداعي. أن ينشئ الطالب محتوى الإبداعي، مثل القصص والقصائد والكود، باستخدام أدوات الذكاء الصناعي.	أن يشارك الطالب المحتوى الإبداعي الذي أنشأه مع زملائه وأن يتلقى منهم ردود فعل.	موقع ويب أو تطبيق يسمح بإنشاء المحتوى الإبداعي باستخدام أدوات الذكاء الصناعي.

Figure 2. Gemini's Arabic Syllabi Production (Summarized from Annova's<sup>17</sup> Framework)

<sup>17</sup> Fauzana Annova, "Konsep Pengembangan Bahan Ajar Bahasa Arab Bagi Peserta Didik Di Indonesia," *Alibbaa': Jurnal Pendidikan Bahasa Arab* 3, no. 2 (July 31, 2022): 141–61, <https://doi.org/10.19105/ajpba.v3i2.6228>.

Teachers express the seamless integration of Gemini into their Arabic language learning curricula, highlighting its role as an innovative supplementary tool. Gemini enhances students' learning experiences by introducing dynamic texts and interactions, enriching the educational environment. Teachers particularly appreciate Gemini's capability to correct misconceptions and offer in-depth explanations, contributing to more enriched classroom discussions. This dynamic correction and explanation feature has proven instrumental in fostering a deeper understanding of Arabic language concepts among students (Figure 2). The tool's adaptability and effectiveness in addressing linguistic nuances contribute significantly to creating a more engaging and effective learning atmosphere.

In its application in classrooms, teachers note that Gemini not only functions as a learning tool but also as a responsive partner. Gemini's quick responses and its ability to adapt learning materials to the specific needs of the class have provided the flexibility needed in delivering instructional content. Teachers feel that Gemini is not just an aid but more like a companion in guiding their students through the complexities of the Arabic language.

Table 1. Gemini’s Generated Arabic Rhetoric Materials

Lesson Topic	Learning Objectives	Teaching Activities	Assessment	Educational Resources
Rules of Rhetoric	To know the basic rules of rhetoric and to apply them in writing and presenting speeches.	Students will read a text on the rules of rhetoric and answer related questions. Students will write a speech on a topic of their choice and present it to their classmates.	Students will deliver a speech on a topic of their choice to an evaluation committee.	A book or online resource on the rules of rhetoric.
Types of Speeches	To know the different types of speeches and to distinguish between them. To write a speech of each type of speech.	Students will read a text on the different types of speeches and answer related questions. Students will discuss the different types of speeches with their classmates and give examples.	Students will write a speech of each type of speech (persuasive speech, informative speech, praise speech, eulogy) and present it to their classmates.	A book or online resource on the different types of speeches.

Elements of a Speech	To know the basic elements of a speech and to apply them in writing and presenting speeches.	Students will read a text on the basic elements of a speech and answer related questions. Students will identify the basic elements of a speech in a speech of their choice.	Students will write a speech on a topic of their choice and include all the basic elements of a speech.	A book or online resource on the basic elements of a speech.
How to Deliver Speeches	To know how to deliver speeches effectively. To deliver a speech on a topic of their choice to their classmates.	Students will watch a video on how to deliver speeches effectively. Students will practice delivering speeches in front of their classmates.	Students will deliver a speech on a topic of their choice to an evaluation committee.	A book or online resource on how to deliver speeches effectively.
Speech Analysis	To know how to analyze different speeches. To analyze different speeches in terms of their content, style, and delivery.	Students will read a text on how to analyze speeches and answer related questions. Students will analyze different speeches in terms of their content, style, and delivery.	Students will write an analysis of a speech of their choice and present it to their classmates.	A book or online resource on how to analyze speeches.

Participants feel the need to ensure that their syllabi effectively incorporate the use of Gemini to support Arabic language understanding. This requires collaboration between Arabic language teachers and Gemini developers to create relevant, accurate materials aligned with curriculum objectives. Additionally, there are issues related to assessing student progress. How to measure the impact of Gemini's use in achieving syllabus objectives per topic? There is a need for assessment methods that cover specific Arabic language skills while taking into account Gemini's contribution to enhancing student understanding.

### Defining Issues and Challenges (RQ2)

The integration of Gemini into Google products, particularly its generative AI technology, is seen as a transformative tool for enhancing office productivity platforms, according to William McKeon-White in Ajao's research. Despite its potential, concerns about accuracy persist, with reported instances of the AI chat tool providing incorrect data or misguided suggestions in the context of the Arabic language. Privacy is

another significant consideration, as individual users may have varying risk tolerances regarding sharing information for AI improvement. Integrating Gemini into the Arabic language curriculum requires collaborative efforts among language experts, educators, and technology developers. Challenges include developing learning materials aligned with student needs, ensuring accuracy through collaboration among language experts, and providing intensive training for teachers. Assessing Gemini's impact on Arabic language learning involves developing evaluation metrics covering accuracy, creativity, and readability. Overcoming constraints in developing a teacher framework requires a focus on Arabic language learning, emphasizing flexibility and affordability. Addressing challenges in Gemini's accuracy and objectivity involves additional training with diverse datasets and the development of more advanced machine learning and natural language processing techniques.<sup>18</sup>

The incorporation of Gemini into the Arabic language curriculum represents more than a mere inclusion of educational technology; it signifies a transformative paradigm in the realm of learning. This evolution is marked by a symbiotic collaboration among educators, technologists, and linguistic experts. The ongoing refinement of Gemini's technology and the deployment of inventive solutions underscore a commitment to enhancing Arabic language education in the contemporary landscape. This transformative approach resonates with the findings of researchers across diverse countries in recent years<sup>19</sup>, aligning with a global trend towards leveraging advanced technologies to enrich language learning experiences.<sup>20</sup>

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<sup>18</sup> Esther Ajao, "Benefits, Risks of Google AI Chatbot's Gemini Extensions | TechTarget," Enterprise AI, 2023, <https://www.techtarget.com/searchenterpriseai/news/366552898/Benefits-risks-of-Google-AI-chatbots-Gemini-Extensions>.

<sup>19</sup> Fengchun Miao et al., *AI and Education: A Guidance for Policymakers* (UNESCO Publishing, 2021), <https://doi.org/10.54675/PCSP7350>; Rosario Michel-Villarreal et al., "Challenges and Opportunities of Generative AI for Higher Education as Explained by ChatGPT," *Education Sciences* 13, no. 9 (2023): 856, <https://doi.org/10.3390/educsci13090856>; Southworth et al., "Developing a Model for AI Across the Curriculum."

<sup>20</sup> Manjur Kolhar and Abdalla Alameen, "Artificial Intelligence Based Language Translation Platform.," *Intelligent Automation & Soft Computing* 28, no. 1 (2021), <http://dx.doi.org/10.32604/iasc.2021.014995>; Mohamed, "Exploring the Potential of an

### **Gemini in Educational Discourse**

The AI Curriculum Integration Framework guides AI incorporation into education (illustrated in Figure 3). It includes Learning Goals (overarching objectives), Teaching Objectives (specific achievements), Assessment Strategies (evaluation methods), and Resources and Tools (support materials). All areas align to ensure effective learning.<sup>21</sup> For instance, a lesson plan on AI could utilize this framework by setting a learning goal for students to define AI and explain AI algorithms.

The teaching objectives could involve detailing supervised, unsupervised, and reinforcement learning, while assessment strategies might include quizzes and essays. Resources and tools, like AI textbooks and internet access, support curriculum integration. Overall, this framework proves invaluable in guiding the development and implementation of AI curricula in diverse educational settings (Figure 3). These are described in technology-based pedagogical contexts by Indonesian researchers.<sup>22</sup>

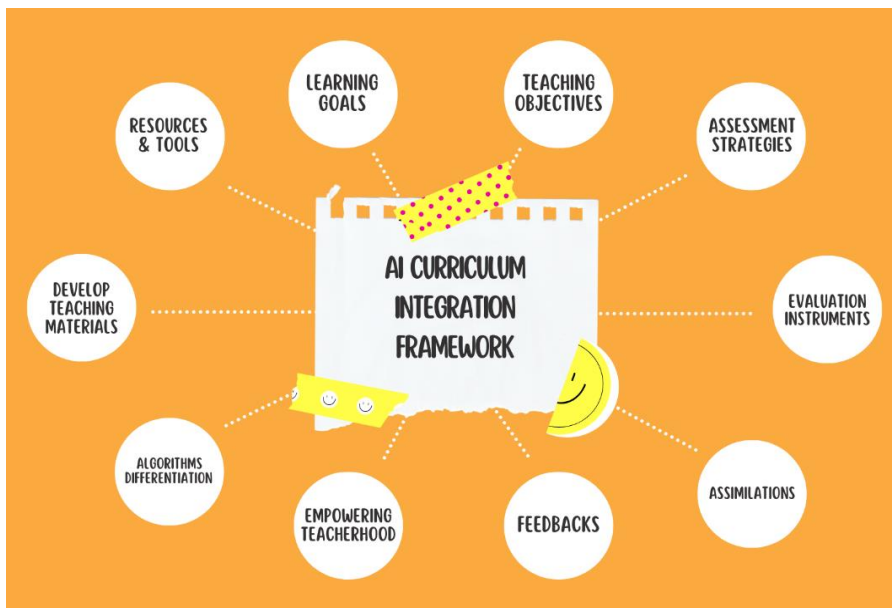
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AI-Based Chatbot (ChatGPT) in Enhancing English as a Foreign Language (EFL) Teaching: Perceptions of EFL Faculty Members.”

<sup>21</sup> Jeong-Won Han, Junhee Park, and Hanna Lee, “Analysis of the Effect of an Artificial Intelligence Chatbot Educational Program on Non-Face-to-Face Classes: A Quasi-Experimental Study,” *BMC Medical Education* 22, no. 1 (December 1, 2022): 830, <https://doi.org/10.1186/s12909-022-03898-3>.

<sup>22</sup> Farrah Camelia, “Analisis Landasan Ilmu Pengetahuan Dan Teknologi Dalam Pengembangan Kurikulum,” *SAP (Susunan Artikel Pendidikan)* 5, no. 1 (2020); Tedjo Narsoyo Reksoatmodjo, “Pengembangan Kurikulum Pendidikan: Teknologi Dan Kejuruan,” 2010.

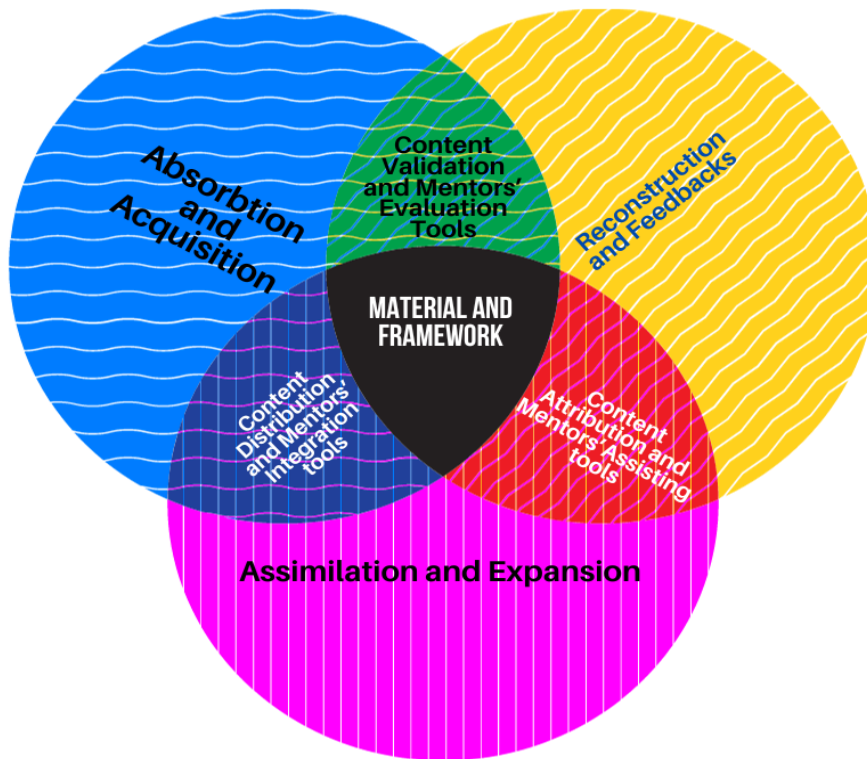




*Figure 3: AI-Curriculum Integration Framework (Summarised from Teachers' Annual Goals and Achievements, Ministry of Religious Affairs, Republic of Indonesia)*

The revolution of Artificial Intelligence (AI) in education involves methods and strategies used to teach AI applicatively to students. This encompasses not only technical skills related to AI development, such as programming and AI algorithms, but also broader AI concepts and principles, such as machine learning, natural language processing, and robotics in the realm of education, especially language education.<sup>23</sup> An essential aspect of AI pedagogy is the emphasis on direct and experiential learning. This can include frameworks that apply AI to materials and productive and constructive human-AI interactive activities (figure 4). These activities not only assist students in learning technical skills but also promote creativity, critical thinking, and problem-solving skills crucial for success in the field of AI.

<sup>23</sup> Francisco J Cantú-Ortiz et al., "An Artificial Intelligence Educational Strategy for the Digital Transformation," *International Journal on Interactive Design and Manufacturing (IJIDeM)* 14 (2020): 1195–1209, <https://doi.org/10.1007/s12008-020-00702-8>.



*Figure 4. Mentors-AI's Collaborative Works (Domain and Themes in Gemini's post-examination)*

This figure presents a Venn diagram, summarized from Southworth<sup>24</sup>, illustrating the collaborative works between Mentors and AI within the context of Gemini's post-examination, highlighting three core areas of collaboration: Absorption and Acquisition, Assimilation and Expansion, and Reconstruction and Feedback. The blue circle, symbolizing Absorption, and Acquisition, emphasizes the gathering and assimilation of knowledge and resources. The magenta circle, representing Assimilation and Expansion, focuses on the integration and application of the acquired knowledge to generate new insights and solutions, encompassing themes like "Content Distribution and Mentors' Integration Tools" and "Content Attribution and Mentors' Assisting Tools." The yellow circle, denoting Reconstruction and Feedback, underscores the iterative process of refining and enhancing existing knowledge through feedback. At the central intersection of these three circles lies the "Material and Framework" section, shaded in black, which signifies the foundational elements that underpin the collaborative

<sup>24</sup> Southworth et al., "Developing a Model for AI Across the Curriculum."

efforts between Mentors and AI. The overlapping regions of the circles contain specific themes elaborating on their intersection, such as "Content Validation and Mentors' Evaluation Tools" in the overlap between Absorption and Acquisition and Reconstruction and Feedback. This diagram effectively portrays the interconnected nature of these domains and themes, illustrating a comprehensive approach to collaboration in the context of Gemini's post-examination after collecting teachers' and students' perspectives.

Educators must actively understand the potential and limitations of AI<sup>25</sup>, as well as its potential impact on students and the ethical considerations involved in its development and implementation. Like other technology users, educators need knowledge and understanding to make informed decisions about the use of these innovations.<sup>26</sup> The curriculum, as organized by Silvia et al.<sup>27</sup>, can be enhanced by identifying mechanisms to connect disciplines and address these potentials and limitations. After all, AI not only provides opportunities and more transformative pedagogical models but also meets the modern world's need to develop more competitive individuals.<sup>28</sup>

Integrating Gemini into each lesson within an effective instructional framework can yield a more dynamic learning experience.<sup>29</sup>

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<sup>25</sup> Miles Brundage et al., "Toward Trustworthy AI Development: Mechanisms for Supporting Verifiable Claims," *arXiv Preprint arXiv:2004.07213*, 2020, <https://doi.org/10.48550/arXiv.2004.07213>.

<sup>26</sup> Ng et al., "A Review of AI Teaching and Learning from 2000 to 2020"; Najwa Amanina Bizami, Zaidatun Tasir, and Si Na Kew, "Innovative Pedagogical Principles and Technological Tools Capabilities for Immersive Blended Learning: A Systematic Literature Review," *Education and Information Technologies* 28, no. 2 (February 2023): 1373–1425, <https://doi.org/10.1007/s10639-022-11243-w>.

<sup>27</sup> Neng Silvia et al., "Manajemen Perencanaan Dan Pengorganisasian Pembelajaran Bahasa Arab," *Alibbaa': Jurnal Pendidikan Bahasa Arab* 4, no. 1 (January 31, 2023): 108–23, <https://doi.org/10.19105/ajpba.v4i1.7497>.

<sup>28</sup> Author (deleted for peer review), Eko Budi Hartanto, and Fatchiatu Zahro, "Acceptability and Effectiveness Analysis of Large Language Model-Based Artificial Intelligence Chatbot Among Arabic Learners," *Mantiq Tayr: Journal of Arabic Language* 4, no. 1 (2024): 1–20, <https://doi.org/10.25217/mantiqtayr.v4i1.3951>.

<sup>29</sup> Gency Gencai I, "I Compared Google Gemini & ChatGPT for Machine Learning: Exploring the Capabilities of ChatGPT and Google Gemini: A Comparative Analysis for Machine Learning Using Python and AI Language Models," *Geek Culture*

Embedding Gemini in every lesson enables students to interact with responsive and reliable educational technology. For instance, Gemini can provide additional explanations, practical assignments, and instant corrections.<sup>30</sup> Integrated use of Gemini also allows for curriculum adaptation based on individual student progress, creating an engaging and relevant learning environment. With this approach, Arabic language learning becomes not only more efficient but also motivates students to actively participate in the learning process.<sup>31</sup>

## **Conclusion**

The integration of Gemini into the Arabic language curriculum signifies a transformative leap in language education, offering the potential to enrich learning with realistic and contextually rich Arabic texts. Despite the opportunities, challenges such as tailored material development, teacher training, and sustainable assessment strategies arise. Collaboration among linguists, educators, and tech developers is key to overcoming these challenges. Embracing Gemini in language education requires ongoing adaptation, balancing technological advancements with the essential role of human instructors. Gemini's success lies in complementing teaching methods, reflecting a commitment to excellence. Overcoming challenges and capitalizing on Gemini's potential can lead to a more engaging and effective Arabic language curriculum, shaping the future of language education with artificial intelligence through collaborative efforts and feedback.

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(blog), April 17, 2023, <https://medium.com/geekculture/i-compared-google-gemini-chatgpt-for-machine-learning-aa46d210c734>.

<sup>30</sup> Esther Ajao, “Benefits, Risks of Google AI Chatbot’s Gemini Extensions | TechTarget.”

<sup>31</sup> Renate Andersen, Anders I. Mørch, and Kristina Torine Litherland, “Collaborative Learning with Block-Based Programming: Investigating Human-Centered Artificial Intelligence in Education,” *Behaviour & Information Technology* 41, no. 9 (July 4, 2022): 1830–47, <https://doi.org/10.1080/0144929X.2022.2083981>.

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