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Artificial Intelligence as an Enabler of Differentiated Arabic Language Instruction in Inclusive Secondary Education

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Abstract

Differentiated instruction is essential for inclusive education, yet its implementation in Arabic language learning remains challenging. This study examines the implementation of differentiated instruction in inclusive Arabic language classrooms and explores the role of Artificial Intelligence (AI) in supporting its implementation. A qualitative field research design was employed at four public Islamic senior high schools in Madura, Indonesia. Data were collected through classroom observations, in-depth interviews, and document analysis, and analyzed using the interactive model of Miles, Huberman, and Saldaña. The findings indicate that differentiated instruction remains concentrated on learning products, while differentiation of content and instructional processes is still limited. AI assists teachers in simplifying learning materials, developing instructional media, providing adaptive learning activities, and designing flexible assessments that accommodate diverse learning needs. These findings demonstrate that AI functions as a pedagogical enabler that strengthens differentiated instruction, making Arabic language learning more inclusive, adaptive, and learner-centered.

Keywords: *differentiated instruction; Artificial Intelligence; Arabic language learning; inclusive education; AI in education*

Abstrak

Pembelajaran berdiferensiasi merupakan pendekatan penting dalam mewujudkan pendidikan inklusif, tetapi implementasinya pada pembelajaran bahasa Arab masih menghadapi berbagai kendala. Penelitian ini bertujuan menganalisis implementasi pembelajaran berdiferensiasi dalam pembelajaran bahasa Arab di kelas inklusi serta mengkaji peran *Artificial Intelligence* (AI) dalam mendukung implementasinya. Penelitian menggunakan pendekatan kualitatif dengan jenis penelitian lapangan pada empat Madrasah Aliyah Negeri di Madura. Data dikumpulkan melalui observasi, wawancara mendalam, dan dokumentasi, kemudian dianalisis menggunakan model interaktif Miles, Huberman, dan Saldaña. Hasil penelitian menunjukkan bahwa diferensiasi pembelajaran masih didominasi pada aspek produk, sedangkan diferensiasi konten dan proses belum diterapkan secara optimal. AI membantu guru menyederhanakan materi, mengembangkan media pembelajaran, menyediakan aktivitas belajar yang adaptif, serta menyusun evaluasi yang lebih fleksibel sesuai kebutuhan peserta didik. Temuan ini menunjukkan bahwa AI berperan sebagai pendukung pedagogis yang memperkuat implementasi pembelajaran berdiferensiasi sehingga pembelajaran bahasa Arab menjadi lebih inklusif, adaptif, dan berpusat pada peserta didik.

Kata Kunci: *pembelajaran berdiferensiasi; kecerdasan buatan; pembelajaran bahasa Arab; pendidikan inklusif; AI dalam pendidikan*

Introduction

Arabic language learning in the twenty-first century faces increasingly complex challenges as classrooms become more diverse in terms of students' backgrounds, abilities, and learning needs. As a foreign language learned by the majority of Indonesian students, Arabic differs substantially from learners' first language in its phonological, morphological, syntactic, and orthographic systems.¹ Consequently, successful Arabic language instruction depends not only on the quality of instructional materials but also on teachers' ability to adapt instructional strategies to students' readiness, abilities, motivation, and individual learning needs.² In this context, one-size-fits-all instruction is

¹ Icha Gilang Permata, Icha Gilang Permata, and Machrup Eko Cahyono. "Implications of Social Anxiety Disorder on the Improvement of Maharah Al-Kalam Arabic Students." *Alibbaa': Jurnal Pendidikan Bahasa Arab* 4, no. 2 (July 2023): 124–47. <https://doi.org/10.19105/ajpba.v4i2.8877>.

² Suja, Aidillah, Syarifaturrahmatullah, Khairil Anwar, Fachrurrazi, Muchsinul Khuluq, and Lina Eka Retnaningsih. "Islamic Kindergarten Teachers' Beliefs about Early Arabic Learning in the Indonesian Context: Advantaged Learning, Teacher's Ability, and Their Methods in Teaching Arabic." *Journal of Early Childhood*

no longer sufficient to accommodate learner diversity, particularly in language education, where receptive and productive language skills must be developed simultaneously.³

These challenges are even more evident in inclusive Islamic senior high schools (*Madrasah Aliyah*) where Arabic is taught as a core subject. Besides developing students' linguistic competence, these schools are expected to ensure equitable learning opportunities for all learners, including those with special educational needs. This challenge is particularly relevant in Madurese *Madrasah Aliyah*, where inclusive education is implemented amid diverse academic abilities, limited adaptive learning resources, and varying levels of teachers' readiness to integrate educational technologies. Such conditions place Arabic language teachers in a demanding pedagogical context, requiring them to manage heterogeneous linguistic abilities while addressing individual learning needs within the same classroom.⁴

Differentiated instruction has been widely recognized as an appropriate pedagogical approach to addressing these challenges. It emphasizes adapting instructional content, processes, products, and learning environments according to students' readiness, interests, and learning profiles, thereby providing equitable opportunities for all learners to achieve intended learning outcomes.⁵ Its application is particularly important in Arabic language education, where students often demonstrate considerable variation in vocabulary acquisition, grammatical competence, pronunciation, reading comprehension, and communicative proficiency. Despite its pedagogical potential, implementing differentiated instruction remains challenging because

Teacher Education, October 26, 2025, 1–13.
<https://doi.org/10.1080/10901027.2025.2581022>.

³ PAPI, MOSTAFA, ANGEL RIOS, HUNTER PELT, and ESRA OZDEMIR. "Feedback-Seeking Behavior in Language Learning: Basic Components and Motivational Antecedents." *The Modern Language Journal* 103, no. 1 (March 2019): 205–26. <https://doi.org/10.1111/modl.12538>.

⁴ Susiawati, Iis, and Moch. Hasyim Fanirin. "ARABIC LEARNING AT MADRASAH ALIYAH BASED ON THE 2013 CURRICULUM." *Arabiyat : Jurnal Pendidikan Bahasa Arab Dan Kebahasaaraban* 7, no. 2 (December 2020): 251–63. <https://doi.org/10.15408/a.v7i2.17444>.

⁵ Subandiyah, Heny, Riki Nasrullah, Rizki Ramadhan, Haris Supratno, Resdianto Permata Raharjo, and Fahmy Lukman. "The Impact of Differentiated Instruction on Student Engagement and Achievement in Indonesian Language Learning." *Cogent Education* 12, no. 1 (December 2025). <https://doi.org/10.1080/2331186X.2025.2516378>.

teachers frequently struggle to design diverse instructional materials, learning activities, and assessments within the constraints of limited time, resources, and administrative workload.

Recent advances in Artificial Intelligence (AI) offer promising opportunities to overcome these limitations. AI enables teachers to generate adaptive learning materials, simplify texts according to students' proficiency levels, provide personalized learning activities, deliver automated feedback, and continuously monitor learning progress.⁶ In Arabic language learning, AI further supports the creation of contextual dialogues, visual learning resources, language exercises, speech recognition applications, and context-aware translation, all of which have the potential to strengthen differentiated instruction.⁷ Accordingly, AI should no longer be viewed merely as an instructional technology but rather as a *pedagogical enabler* that empowers teachers to design more adaptive, responsive, and learner-centered learning experiences.

Research on differentiated instruction, inclusive education, and Artificial Intelligence has expanded considerably in recent years. El Nagggar, Gaad, and Inocencio (2024) demonstrated that AI integration enhances inclusive education by providing more adaptive learning experiences for students with diverse educational needs.⁸ Likewise, Suprihatiningrum and Syaripudin (2026), through a systematic review of 41 studies, concluded that AI, adaptive learning technologies, and digital platforms substantially support differentiated instruction by facilitating the differentiation of instructional content, learning processes, learning products, and learning environments.⁹ However, successful implementation of differentiated instruction depends not only on

⁶ Elzerman, Garth H. "When AI Does the Thinking: The Risks of Over-Reliance on Artificial Intelligence in Higher Education Language Learning." *2025 5th International Conference on Artificial Intelligence and Education (ICAIE)*, May 14, 2025, 773–78. <https://doi.org/10.1109/ICAIE64856.2025.11158185>.

⁷ Alharbi, Wael. "AI in the Foreign Language Classroom: A Pedagogical Overview of Automated Writing Assistance Tools." *Education Research International* 2023 (February 2023): 1–15. <https://doi.org/10.1155/2023/4253331>.

⁸ Nagggar, Alia el, Eman Gaad, and Shannaiah Aubrey Mae Inocencio. "Enhancing Inclusive Education in the UAE: Integrating AI for Diverse Learning Needs." *Research in Developmental Disabilities* 147 (April 2024): 104685. <https://doi.org/10.1016/j.ridd.2024.104685>.

⁹ Suprihatiningrum, Jamil, and Ahmad Syaripudin. "Technology for Equity: A Systematic Review of AI, Adaptive Tools, and Digital Platforms in Differentiated Instruction." *Texto Livre* 19 (2026). <https://doi.org/10.1590/1983-3652.2026.61658>.

technological availability but also on teachers' readiness. Alnahdi et al. (2025) found that teachers' attitudes and preparedness constitute critical determinants of successful differentiated instruction.¹⁰

Comparable developments have also emerged in language education. Haq, Madi, and Anam (2025) reported that AI enhances the accessibility of Arabic language learning for students with disabilities by providing adaptive instructional materials and learning activities.¹¹ Similarly, Anwar et al. (2026) found that integrating Universal Design for Learning (UDL) with AI-assisted technologies significantly improves student engagement and academic achievement among learners with disabilities.¹² Nevertheless, these studies have largely examined AI, differentiated instruction, inclusive education, and Arabic language learning as separate areas of inquiry. Empirical evidence explaining how AI functions as a pedagogical mechanism to support differentiated instruction in inclusive Arabic language classrooms remains limited. Most previous studies have positioned AI primarily as an *instructional tool* for generating teaching materials or learning media rather than as a *pedagogical enabler* that strengthens the integrated differentiation of instructional content, learning processes, and assessment products. Furthermore, empirical evidence from inclusive Islamic senior high schools in Indonesia, particularly in Madura, remains scarce, despite the unique intersection of Arabic language instruction, inclusive education, and technological constraints characterizing this educational context.

Addressing these gaps, this study aims to examine the implementation of differentiated instruction in inclusive Arabic language classrooms and to explore the role of Artificial Intelligence in supporting

¹⁰ Alnahdi, G. H., Marcela Pozas, Mona F. Sulaimani, and V. Letzel-Alt. "The Psychometric Properties of the Arabic Version of the Teachers' Attitudes towards Differentiated Instructional Scale." *Frontiers in Psychology* 16 (August 2025). <https://doi.org/10.3389/fpsyg.2025.1425152>.

¹¹ Haq, Muhammad Zaairul, Faisol Nasar bin Madi, and Syamsul Anam. "Optimizing Arabic Language Learning for Students with Disabilities through Artificial Intelligence in Distance Education." *Al-Ta'rib : Jurnal Ilmiah Program Studi Pendidikan Bahasa Arab IAIN Palangka Raya* 13, no. 2 (December 2025): 286–300. <https://doi.org/10.23971/altarib.v13i2.9871>.

¹² Anwar, Mohammad, Ravik Karsidi, Sunardi Sunardi, and Herry Widyastono. "The Effects of Universal Design for Learning and AI-AT on the Engagement and Academic Outcomes of Students with Disabilities." *International Journal of Learning, Teaching and Educational Research* 25, no. 3 (March 2026): 557–81. <https://doi.org/10.26803/ijlter.25.3.24>.

its implementation. Specifically, the study addresses two research questions: (1) How is differentiated instruction implemented in inclusive Arabic language classrooms at the secondary education level? (2) How does Artificial Intelligence support the implementation of differentiated instruction in inclusive Arabic language classrooms? By answering these questions, this study contributes to Arabic language education by providing empirical evidence on differentiated instructional practices in inclusive *Madrasah Aliyah* and by advancing the perspective that AI functions not merely as an *instructional tool* but as a *pedagogical enabler* that enhances teachers' capacity to deliver more adaptive, responsive, and inclusive Arabic language instruction.

Method

This study employed a qualitative field research design to obtain an in-depth understanding of the implementation of Artificial Intelligence (AI)-supported differentiated instruction in Arabic language learning within inclusive secondary classrooms.¹³ A qualitative approach was selected because it enables the investigation of educational phenomena in their natural context by exploring participants' experiences, interactions, and instructional practices. The study was conducted in four public Islamic senior high schools (*Madrasah Aliyah Negeri* [MAN]) in Madura, namely MAN Bangkalan, MAN Sampang, MAN 1 Pamekasan, and MAN Sumenep. These schools were purposively selected because they implement inclusive education and have incorporated digital technologies into Arabic language instruction.

The participants comprised Arabic language teachers and students enrolled in inclusive Arabic language classes. Among the students were several learners with special educational needs, including slow learners, students with reading difficulties, and those with mild attention deficits. Participants were selected through purposive sampling based on their direct involvement in the implementation of differentiated instruction, ensuring that they could provide information relevant to the research objectives.

Data were collected through classroom observations, in-depth interviews, and document analysis. Classroom observations were conducted over twelve Arabic language lessons across the four

¹³ John W. Creswell, and Cheryl N. Poth. *Qualitative Inquiry and Research Design*. 5th ed. SAGE Publications, Inc, 2023.

participating schools, focusing on the implementation of differentiated instruction, teacher–student interactions, the integration of AI, the participation of students with special educational needs, and students' responses throughout the learning process. In-depth interviews were conducted with both teachers and students to gain deeper insights into instructional practices and the role of AI in supporting differentiated instruction. Documentary evidence, including lesson plans, instructional materials, learning media, and other relevant documents, was used to complement the observational and interview data.

The data were analyzed using the interactive model proposed by Miles, Huberman, and Saldaña,¹⁴ which consists of data condensation, data display, and conclusion drawing and verification. Throughout the analysis, the data were systematically coded, organized into themes aligned with the research objectives, and interpreted to identify recurring patterns and meanings. To ensure the trustworthiness of the findings, source triangulation was employed by comparing interview data obtained from Arabic language teachers, students, and special education support teachers. Methodological triangulation was also applied by cross-checking evidence derived from observations, interviews, and documentary sources, thereby enhancing the consistency and credibility of the findings.

Results and Discussion

Implementation of Differentiated Instruction

The findings indicate that differentiated instruction has not yet been fully implemented in Arabic language learning within inclusive classrooms at MAN Bangkalan, MAN Sampang, MAN 1 Pamekasan, and MAN Sumenep. Although all four schools have adopted inclusive education policies, instructional practices remain largely characterized by uniform approaches to content delivery, classroom instruction, and assessment. Teachers have attempted to provide inclusive learning opportunities for all students, including those with special educational needs; however, differentiated instruction is implemented only partially and has not yet become an integral component of instructional planning or classroom practice.

¹⁴ Matthew B. Miles, A. Michael Huberman, and Johnny Saldaña. *Qualitative Data Analysis: A Methods Sourcebook*. 3rd ed. Thousand Oaks, CA: SAGE Publications, 2014.

Regarding content differentiation, most teachers continue to use the same instructional materials, learning objectives, and learning resources for all students without adapting them to learners' readiness, learning profiles, or individual abilities. Classroom observations revealed that Arabic vocabulary (*mufradāt*), sentence structures, and grammatical rules (*nahwu*) were presented at the same level of difficulty to all students. Consequently, students with special educational needs—particularly slow learners, those with reading difficulties, and those with mild attention deficits—experienced difficulties following classroom instruction because they were expected to master learning materials with the same level of complexity as their peers. Analysis of instructional documents further showed that most lesson plans employed identical learning objectives and performance indicators for all students, with little or no modification for learners with special educational needs.

A similar pattern was observed in the instructional process. Arabic language instruction was dominated by lectures, written exercises, and whole-class teaching, with a common instructional pace applied to all students. As a result, opportunities to adapt teaching strategies to students' individual characteristics remained limited. Although teachers occasionally provided additional assistance to students experiencing learning difficulties, such support was generally spontaneous rather than intentionally designed as part of a differentiated instructional strategy. Consequently, many students with special educational needs assumed relatively passive roles in classroom activities and participated in learning without receiving instructional experiences that adequately reflected their individual needs and abilities.

Differentiation was more evident in the learning products than in the instructional content or process. Teachers provided students with flexibility in completing assignments and demonstrating learning outcomes through different forms of task completion according to their abilities. However, these variations were not accompanied by comparable adaptations in instructional materials or learning activities. Interview data revealed that limited preparation time, insufficient adaptive learning resources, and varying levels of teachers' digital pedagogical competence were the primary factors constraining the comprehensive implementation of differentiated instruction. Overall, the findings suggest that differentiated instruction in inclusive Arabic language classrooms remains concentrated on differentiated learning products, while content and process differentiation have yet to be implemented systematically.

The Role of AI in Supporting Differentiated Instruction

The findings demonstrate that Artificial Intelligence (AI) functions as a supportive technology that enables teachers to implement differentiated instruction more effectively in inclusive Arabic language classrooms. Rather than replacing teachers, AI assists them in adapting instructional materials, teaching strategies, and assessment methods to accommodate students' diverse characteristics and learning needs. AI also helps overcome practical constraints previously encountered by teachers, particularly in developing adaptive instructional materials and creating more engaging learning media for students with special educational needs.

In terms of content differentiation, teachers used AI to simplify Arabic texts, translate vocabulary, develop instructional materials at different levels of difficulty, and generate visual illustrations that facilitated conceptual understanding. These applications enabled teachers to transform abstract language content into more accessible learning resources. Students with special educational needs were therefore able to study instructional materials that matched their abilities instead of engaging with the same level of complexity as their peers. Consequently, AI expanded teachers' capacity to provide differentiated learning materials that would otherwise have been difficult to prepare manually because of time and resource constraints.

AI also supported process differentiation by facilitating the development of more interactive learning experiences through visual media, audio resources, text-to-speech applications, and adaptive quizzes. Classroom observations showed that these technologies increased students' participation and engagement throughout the learning process. Students became more actively involved in pronunciation practice, question-and-answer sessions, and learning activities presented through multimedia resources. Furthermore, adaptive quizzes enabled students to practice according to their individual proficiency levels, allowing them to participate in classroom learning without feeling disadvantaged relative to their classmates. These features created a more flexible learning environment in which students could progress at their own pace.

The contribution of AI was equally evident in product differentiation. Teachers used AI to design varied learning tasks, develop more adaptive assessments, and provide faster feedback on students' performance. This flexibility enabled students to demonstrate learning outcomes through assignments that reflected their individual abilities. At

the same time, AI reduced teachers' administrative workload in preparing instructional materials, learning media, and assessment instruments, allowing them to devote more time to providing direct guidance and individualized support during classroom instruction.

Table 1. The Role of AI in Supporting Differentiated Arabic Language Instruction

Dimension	Before AI Integration	AI Support	Research Findings
Content	Uniform instructional materials	Text simplification, vocabulary translation, visual illustrations, leveled learning materials	Learning materials became more accessible to students with different ability levels.
Process	Instruction dominated by lectures and written exercises	Audio-visual media, text-to-speech applications, adaptive quizzes	Student participation and classroom engagement increased.
Product	Relatively uniform assignments and assessments	Adaptive learning tasks, differentiated assessments, and faster feedback	Learning outcomes became more varied and aligned with students' individual characteristics.
Teacher Support	Manual preparation of instructional materials	More efficient development of instructional materials, learning media, and assessments	Teachers had more time to provide individualized learning support.

As shown in Table 1, AI supports differentiated instruction across the three core dimensions of content, process, and product. Beyond facilitating the development of more diverse instructional materials and learning activities, AI also provides greater flexibility in assessment design while improving teachers' instructional efficiency. These findings suggest that AI serves as a pedagogical enabler, expanding teachers'

capacity to provide more adaptive learning experiences for students with special educational needs.

Despite these benefits, the integration of AI remains constrained by several practical challenges. Interview findings revealed that some teachers still have limited digital literacy, reducing their ability to utilize AI applications effectively. In addition, inadequate internet connectivity and limited availability of digital learning devices in several schools hinder the consistent integration of AI across classroom activities. Teachers also emphasized that AI should complement rather than replace direct teacher–student interaction. Accordingly, AI is viewed as a pedagogical support that enhances instruction while preserving the teacher's central role in providing guidance, mentoring, and individualized attention to students' diverse learning needs.

Discussion

The findings indicate that the implementation of differentiated instruction in inclusive Arabic language classrooms remains in a transitional phase toward fully inclusive teaching. Although all four participating *Madrasah Aliyah* have formally adopted inclusive education policies, classroom practices have yet to fully reflect the principles of differentiated instruction that underpin inclusive education, namely, providing learning experiences tailored to students' readiness, needs, interests, and learning profiles.¹⁵ Penyesuaian pembelajaran masih lebih banyak dilakukan pada hasil akhir atau produk pembelajaran, sementara materi yang dipelajari maupun strategi pembelajaran yang digunakan cenderung tetap seragam bagi seluruh peserta didik. Kondisi ini memperlihatkan bahwa keberadaan kelas inklusi belum secara otomatis diikuti oleh perubahan paradigma dalam merancang pembelajaran yang responsif terhadap keragaman karakteristik siswa.

These findings imply that the central challenge of inclusive education has shifted beyond providing access to learning toward enabling teachers to translate inclusive principles into everyday pedagogical practice.¹⁶ Differentiated instruction positions learner

¹⁵ UNESCO, *Global Education Monitoring Report 2020: Inclusion and Education-All Means All* (Paris: UNESCO, 2020), <https://unesdoc.unesco.org/ark:/48223/pf0000373724>.

¹⁶ Nieminen, Juuso Henrik. "Assessment for Inclusion: Rethinking Inclusive Assessment in Higher Education." *Teaching in Higher Education* 29, no. 4 (May 2024): 841–59. <https://doi.org/10.1080/13562517.2021.2021395>.

diversity as the starting point for designing instructional objectives, content, learning activities, and assessment.¹⁷ Consequently, when differentiation is limited to assignments or assessment outcomes, students' individual learning needs remain insufficiently addressed. This finding supports Ainscow's argument that inclusive teaching requires comprehensive adaptation across instructional content, processes, and products rather than focusing on only one dimension.¹⁸

The need for differentiated instruction is particularly pronounced in Arabic language learning because Arabic presents substantially greater linguistic complexity than the first language of most Indonesian learners.¹⁹ Mastery of Arabic phonology, morphology, syntax, and vocabulary develops at different rates according to students' readiness and prior knowledge.²⁰ For students with special educational needs, these linguistic demands become even more challenging when instructional materials are presented uniformly to all learners. This explains why some students continue to experience learning difficulties despite studying in schools that have formally implemented inclusive education.²¹

The Universal Design for Learning (UDL) framework further suggests that inclusive learning environments should be intentionally designed from the outset to accommodate learners with diverse characteristics.²² Accordingly, the effectiveness of inclusive education

¹⁷ Ní Bhroin, Órla, and Fiona King. "Teacher Education for Inclusive Education: A Framework for Developing Collaboration for the Inclusion of Students with Support Plans." *European Journal of Teacher Education* 43, no. 1 (January 2020): 38–63. <https://doi.org/10.1080/02619768.2019.1691993>.

¹⁸ Ainscow, Mel. "Promoting Inclusion and Equity in Education: Lessons from International Experiences." *Nordic Journal of Studies in Educational Policy* 6, no. 1 (January 2020): 7–16. <https://doi.org/10.1080/20020317.2020.1729587>.

¹⁹ Khuluq, Muchsinul, and Siti Zulaikha. "Tadakhkhulu Al-Lughatu al-Umm Fî Mahârati al-Kalâm Bimarkazi al-Lughah al-'Arabiyah Fî Ma'hadi al-'Inâyah Sumber Batu Lilbanât Pegantenan Pamekasan." *Alibbaa': Jurnal Pendidikan Bahasa Arab* 1, no. 1 (July 2020): 1–23. <https://doi.org/10.19105/ajpba.v1i1.3511>.

²⁰ Hadi, Nurul, Nuri Alvina, and Khaled Radhouani. "Ta'zîzu Dâfi'iyati Thullâbi Riyâdh al-Athfâl Li Tathwîri Mahârât al-Lughah al-'Arabiyyah al-Syafawiyyah Min Khilâli Barâmiji al-Ta'lim al-Mukatstsaf." *Alibbaa': Jurnal Pendidikan Bahasa Arab* 5, no. 2 (July 2024): 189–214. <https://doi.org/10.19105/ajpba.v5i2.12195>.

²¹ Ho, Tien Xuan, and Tham My Duong. *The Correlation between Students' Learning Engagement and Their Academic Achievement*. 2024. <https://doi.org/10.4018/979-8-3693-6497-0.ch010>.

²² Morgan, Angel. *Leveraging Generative Artificial Intelligence to Expedite UDL Implementation in Online Courses*. 2024. <https://doi.org/10.4018/979-8-3693-1269-8.ch009>.

should not be evaluated solely by the presence of students with special educational needs in mainstream classrooms, but by teachers' ability to provide multiple means of representation, engagement, and assessment that enable every learner to achieve their potential. From this perspective, differentiated instruction extends beyond a teaching strategy to become a fundamental pedagogical principle underpinning the quality of inclusive education.

Against this background, the role of Artificial Intelligence (AI) deserves particular attention. Rather than replacing teachers, the findings demonstrate that AI expands teachers' pedagogical capacity to implement differentiated instruction more effectively. Limited preparation time, insufficient adaptive learning resources, and heavy administrative responsibilities have long constrained teachers' ability to differentiate instruction comprehensively. AI alleviates these constraints by enabling the rapid development of adaptive instructional materials, learning media, and assessment tasks tailored to students' diverse learning needs.²³

The contribution of AI was evident across all dimensions of differentiated instruction. In content differentiation, AI enabled teachers to simplify Arabic texts, generate visual illustrations, and develop leveled instructional materials aligned with students' proficiency levels. In process differentiation, technologies such as text-to-speech applications, multimedia resources, and adaptive learning activities created more flexible learning experiences, allowing students to progress at their own pace.²⁴ In product differentiation, AI facilitated the design of varied assignments and adaptive assessments while maintaining expected learning outcomes. These findings suggest that AI does not create differentiation itself; rather, it makes differentiated instruction more feasible within the practical constraints of school settings.

These findings are consistent with the growing literature on AI in education, which identifies artificial intelligence as a key enabler of

²³ Rahman, Abdur, Antony Raj, Prajeesh Tomy, and Mohamed Sahul Hameed. "A Comprehensive Bibliometric and Content Analysis of Artificial Intelligence in Language Learning: Tracing between the Years 2017 and 2023." *Artificial Intelligence Review* 57, no. 4 (April 2024): 107. <https://doi.org/10.1007/s10462-023-10643-9>.

²⁴ Thi-Nhu Ngo, Thuy, Howard Hao-Jan Chen, and Kyle Kuo-Wei Lai. "The Effectiveness of Automatic Speech Recognition in ESL/EFL Pronunciation: A Meta-Analysis." *ReCALL* 36, no. 1 (January 2024): 4–21. <https://doi.org/10.1017/S0958344023000113>.

personalized and adaptive learning.²⁵ However, this study extends previous research by demonstrating that the educational value of AI lies not primarily in its technological sophistication but in its capacity to strengthen differentiated instructional practices. Within Arabic language education, AI supports multiple forms of knowledge representation while reducing the complexity of instructional materials, thereby functioning as more than a digital tool. Instead, it serves as a pedagogical bridge between students' diverse learning needs and teachers' limited capacity to address those needs through conventional instructional approaches.²⁶

Nevertheless, AI should not be regarded as a stand-alone solution. Teachers' readiness remains the most critical factor determining the successful integration of AI into classroom instruction. The ability to critically evaluate, adapt, and appropriately utilize AI-generated outputs within specific instructional contexts is considerably more important than merely operating AI applications.²⁷ Moreover, limited digital infrastructure in several participating schools indicates that sustainable AI integration requires institutional support through improved technological infrastructure and continuous professional development.

Overall, the findings suggest that the primary challenge of inclusive Arabic language education lies not only in learner diversity but also in the limited capacity of existing instructional systems to accommodate that diversity effectively. AI offers a promising opportunity to bridge this gap—not by replacing teachers, but by strengthening their ability to implement differentiated instruction more effectively. The principal contribution of this study, therefore, lies in demonstrating that the pedagogical value of AI should be evaluated not by the extent to which it automates teaching, but by the extent to which

²⁵ Alkaabi, Mozah H., and Asma Saeed Almaamari. "Generative AI Implementation and Assessment in Arabic Language Teaching." *International Journal of Online Pedagogy and Course Design* 15, no. 1 (January 2025): 1–18. <https://doi.org/10.4018/IJOPCD.368037>.

²⁶ Adawiyah, Rabi'atul. "Implementing AI in Arabic Language Learning: Challenges and Insights from Islamic Higher Education." *AL-ISHLAH: Jurnal Pendidikan* 17, no. 3 (July 2025): 3729–39. <https://doi.org/10.35445/alishlah.v17i3.7390>.

²⁷ Achruh, Achruh, Muhammad Rapi, Muhammad Rusdi, and Ridwan Idris. "Challenges and Opportunities of Artificial Intelligence Adoption in Islamic Education in Indonesian Higher Education Institutions." *International Journal of Learning, Teaching and Educational Research* 23, no. 11 (November 2024): 423–43. <https://doi.org/10.26803/ijlter.23.11.22>.

it empowers teachers to deliver Arabic language instruction that is more adaptive, inclusive, and responsive to the needs of every learner.

Conclusion

This study demonstrates that differentiated instruction in inclusive Arabic language classrooms at the *Madrasah Aliyah* level has not yet been implemented comprehensively. Differentiation remains concentrated primarily on learning products, whereas systematic adaptation of instructional content and learning processes to students' diverse characteristics is still limited. Within this context, Artificial Intelligence (AI) functions as a pedagogical enabler that assists teachers in developing more adaptive instructional materials, learning media, classroom activities, and assessment strategies. These findings reinforce the view that AI complements rather than replaces teachers by enhancing their capacity to implement differentiated instruction, thereby fostering Arabic language learning that is more inclusive, flexible, and responsive to students' diverse learning needs. Consequently, this study contributes to the field of Arabic language education by providing empirical evidence that AI can help bridge the gap between the theoretical principles of differentiated instruction and their implementation in inclusive classrooms.

The findings also highlight the importance of strengthening Arabic language teachers' pedagogical competence and AI literacy so that AI can be effectively integrated into differentiated instructional practices, supported by appropriate institutional policies and adequate digital infrastructure. Nevertheless, this study is limited by its qualitative design and its focus on four *Madrasah Aliyah* in Madura, and therefore the findings are not intended to be generalized beyond similar contexts. Future research should include a broader range of educational settings and levels, employ mixed-methods or experimental designs to examine the impact of AI on learning outcomes, and explore the effectiveness of different AI applications in promoting more inclusive and differentiated Arabic language instruction.

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