The Effect of Generative AI-ChatGPT on Personalized Learning in UAE Secondary Schools: Evidence from Teachers' Perspectives

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ABSTRACT

Generative AI-ChatGPT is becoming a practical issue in school education because it can support interactive explanation, flexible content generation, and individualized learning assistance. This study examined the effect of Generative AI-ChatGPT on personalized learning among secondary school teachers in the United Arab Emirates. A quantitative cross-sectional survey design was used, and data were collected from 389 teachers through a self-administered questionnaire. The AI-ChatGPT construct was measured through six dimensions: natural interaction, adaptive personalization, knowledge reasoning, data dependence, system integration, and learning analytics. Personalized learning was measured through instructional customization, technology integration, technology use, and self-evaluation. The instrument demonstrated strong internal consistency, with Cronbach's alpha values of .959 for AI-ChatGPT and .936 for personalized learning. Descriptive results showed moderate levels of AI-ChatGPT use and personalized learning practice. Multiple regression analysis showed that the AI-ChatGPT dimensions jointly had a statistically significant effect on personalized learning, explaining 76.0% of its variance. Natural interaction and system integration were significant predictors in the combined model. Simple regression results also showed that each AI-ChatGPT dimension had a significant individual effect on personalized learning. The findings indicate that ChatGPT can support personalized learning when its use is guided by teachers, integrated with school systems, and governed by responsible educational practice.

Keywords: Generative AI; ChatGPT; personalized learning; UAE secondary schools teachers; teachers' perspectives

INTRODUCTION

Artificial intelligence (AI) is not really a far-off idea in education anymore. It is already shaping, maybe a bit quietly, how teachers get ready for lessons, how learners throw questions back, and how schools plan their digital transformation efforts. Generative AI is especially notable, because it tends to operate through natural language, and it can generate explanations, small examples, compact summaries, targeted feedback, and even learning prompts, basically in real time. For teachers, that feels like a chance to support learners in a more adaptable way. For schools, though, it also brings up governance issues around accuracy, privacy, academic integrity, and the responsible way it should be used.

Personalized learning is grounded in a rather simple educational reality: students don’t all learn at the same speed, they do not arrive with the same level of readiness, and they also don’t move along the exact same route. So in real classrooms, personalized learning usually means adjusting learning content, pacing, feedback, activities, and forms of support based on each learner’s specific needs and abilities (Shemshack *et al.*, 2021; Walkington & Bernacki, 2020). Practically, technology can help make this approach more expandable, but technology by itself does not ensure that personalization will be meaningful.

In the UAE secondary school context this matter becomes strategically important. Secondary schools are expected to prepare learners for higher education, for employment, and for life in a society that is quickly

becoming digital. In this environment, ChatGPT might assist teachers in producing learning resources, clarifying hard concepts, supporting self-guided progress, and answering learner questions as they come up. Still, learners need some form of direction so they don't lean too heavily on it, so they avoid weak prompting, unverified responses, and unethical behavior, all of which can slip in if guidance is missing. This study therefore examines the effect of Generative AI-ChatGPT on personalized learning from the standpoint of UAE secondary school teachers. The paper focuses on the direct statistical relationships reported in the thesis findings. It does not add untested claims or additional analyses beyond the available results.

LITERATURE REVIEW AND HYPOTHESES

Generative AI-ChatGPT in personalized learning and AI-supported personalization

AI in education has been used to support intelligent tutoring, adaptive learning systems, learning analytics, assessment, feedback, and recommendation systems (Murtaza *et al.*, 2022; Raj & Renumol, 2022; Akyuz, 2020). ChatGPT adds a conversational layer to these technologies because users can interact with it through ordinary language. This makes it easier for teachers and learners to request explanations, examples, alternative phrasing, and learning support without needing technical commands.

The educational value of ChatGPT is not automatic. Its output depends on the quality of prompts, the relevance of available data, and the user's ability to evaluate generated content. Prior work has warned that AI systems may produce inaccurate, biased, or oversimplified responses and that students may misuse them for unethical academic practices (Ayeni *et al.*, 2024; Maghsudi *et al.*, 2021). These risks do not remove the educational potential of ChatGPT, but they make teacher guidance and institutional policy essential.

Personalized learning places the learner at the center of instructional design. It may include individualized learning paths, differentiated activities, flexible pacing, learner choice, targeted feedback, and self-evaluation (Short & Shemshack, 2023; Basham *et al.*, 2016). AI-supported systems may strengthen these practices by helping teachers analyze learning needs, recommend learning resources, and adapt content to different levels of readiness (Hashim *et al.*, 2022; Peng *et al.*, 2019).

Research on AI-supported personalized learning shows promising benefits, including improved engagement, adaptive feedback, and stronger learner autonomy when AI tools are used alongside human teaching (Katiyar *et al.*, 2024; Yang *et al.*, 2022). The human element remains important. AI can support teacher work, but it should not replace teacher judgment, classroom relationships, or professional responsibility.

Study framework and hypotheses

The study measured AI-ChatGPT through six dimensions. Natural interaction refers to the extent to which ChatGPT enables clear and understandable communication with learning content. Adaptive personalization refers to the ability to adjust educational content and responses to learner needs. Knowledge reasoning refers to support for interpreting, connecting, and explaining information. Data dependence reflects the importance of reliable and updated data for accurate outputs. System integration refers to alignment with educational systems and digital tools. Learning analytics refers to support for tracking learning progress and identifying strengths and weaknesses.

The dependent construct, personalized learning, was measured through four dimensions: instructional customization, technology integration, technology use, and self-evaluation. On this basis, the study tested the following hypotheses:

- H1: AI-ChatGPT dimensions jointly have a statistically significant effect on personalized learning.
- H1a: Natural interaction has a statistically significant effect on personalized learning.
- H1b: Adaptive personalization has a statistically significant effect on personalized learning.

- H1c: Knowledge reasoning has a statistically significant effect on personalized learning.
- H1d: Data dependence has a statistically significant effect on personalized learning.
- H1e: System integration has a statistically significant effect on personalized learning.
- H1f: Learning analytics has a statistically significant effect on personalized learning.

METHODOLOGY

Research design

The study used a quantitative cross-sectional survey design. This design was suitable because the research aimed to measure teachers' perceptions and test the statistical effect of AI-ChatGPT dimensions on personalized learning. The article reports descriptive statistics, reliability analysis, internal-consistency validity, simple linear regression, and multiple linear regression.

Population and sample

The target population consisted of UAE secondary school teachers. The thesis reported a total population of 14,484 teachers and used Yamane's formula to determine the minimum sample size. A total of 400 questionnaires were distributed, and 389 valid responses were retained after excluding incomplete questionnaires. The study therefore used 389 valid teacher responses for analysis.

Instrument

A self-administered questionnaire was used. The instrument included demographic questions, 24 items measuring AI-ChatGPT, and 16 items measuring personalized learning. All substantive items were measured using a five-point Likert scale. Table 1 summarizes the study constructs and dimensions.

Table 1. Study constructs and dimensions

Construct	Dimensions	Items
AI-ChatGPT	Natural interaction; adaptive personalization; knowledge reasoning; data dependence; system integration; learning analytics	24
Personalized learning	Instructional customization; technology integration; technology use; self-evaluation	16

Validity, reliability, and analysis

The questionnaire was reviewed by experts for clarity and relevance. The thesis reported that 84% of experts agreed on the suitability of the language and relevance of the items. A pilot test with 30 respondents was used to assess clarity and reliability before the main survey. Cronbach's alpha was used to assess internal consistency. The reported reliability coefficients were strong for both main constructs and their dimensions.

Table 2. Reliability coefficients

Construct / dimension	Items	Cronbach's alpha
AI-ChatGPT: Natural interaction	4	.910
AI-ChatGPT: Adaptive personalization	4	.826

AI-ChatGPT: Knowledge reasoning	4	.852
AI-ChatGPT: Data dependence	4	.876
AI-ChatGPT: System integration	4	.867
AI-ChatGPT: Learning analytics	4	.930
AI-ChatGPT: Overall	24	.959
Personalized learning: Instructional customization	4	.816
Personalized learning: Technology integration	4	.836
Personalized learning: Technology use	4	.799
Personalized learning: Self-evaluation	4	.929
Personalized learning: Overall	16	.936

The data were analyzed using Statistical Package for the Social Sciences software. Frequencies, percentages, means, standard deviations, Pearson correlation coefficients, Cronbach's alpha, simple linear regression, and multiple linear regression were used according to the study objectives.

FINDINGS

Descriptive results

The overall mean for AI-ChatGPT was 3.06, indicating a moderate level of use. Natural interaction recorded the highest mean among the AI-ChatGPT dimensions, followed by knowledge reasoning and adaptive personalization. The overall mean for personalized learning was 3.11, also indicating a moderate level. Technology integration recorded the highest mean among the personalized learning dimensions.

Table 3. Descriptive statistics for the main dimensions

Construct / dimension	**Mean**	**SD**	**Rank**	**Level**
AI-ChatGPT: Natural interaction	3.36	1.400	1	Moderate
AI-ChatGPT: Knowledge reasoning	3.21	1.393	2	Moderate
AI-ChatGPT: Adaptive personalization	3.14	1.407	3	Moderate
AI-ChatGPT: Data dependence	2.95	1.377	4	Moderate
AI-ChatGPT: Learning analytics	2.88	1.378	5	Moderate
AI-ChatGPT: System integration	2.83	1.501	6	Moderate
AI-ChatGPT: Overall	3.06	1.285	-	Moderate
Personalized learning: Technology integration	3.22	1.287	1	Moderate
Personalized learning: Instructional customization	3.14	1.343	2	Moderate

Personalized learning: Technology use	3.05	1.365	3	Moderate
Personalized learning: Self-evaluation	3.00	1.264	4	Moderate
Personalized learning: Overall	3.11	1.214	-	Moderate

Multiple regression results

Multiple linear regression was used to test the joint effect of the six AI-ChatGPT dimensions on personalized learning. The model was statistically significant, F = 201.381, p = .000. The R value was .872, and R^2 was .760, meaning that the six AI-ChatGPT dimensions jointly explained 76.0% of the variance in personalized learning. In the combined model, natural interaction and system integration were statistically significant predictors.

Table 4. Multiple regression results for AI-ChatGPT dimensions predicting personalized learning

Predictor	**B**	**Beta**	**t**	**p-value**	**Decision**
Natural interaction	.707	.815	16.510	.000	Significant
Adaptive personalization	-.032	-.037	-.335	.738	Not significant
Knowledge reasoning	.006	.007	.143	.887	Not significant
Data dependence	-.080	-.091	-1.248	.213	Not significant
System integration	.224	.277	3.677	.000	Significant
Learning analytics	-.070	-.079	-1.475	.141	Not significant

Model statistics: R = .872; R^2 = .760; adjusted R^2 = .756; F = 201.381; p = .000; constant = .616.

Simple regression results

Simple linear regression was used to test the individual effect of each AI-ChatGPT dimension on personalized learning. Each dimension had a statistically significant individual effect. Natural interaction had the strongest individual explanatory power, explaining 74.8% of the variance in personalized learning.

Table 5. Simple regression results for individual AI-ChatGPT dimensions

Dimension	**B**	**R**	**R^2**	**F**	**p-value**
Natural interaction	.750	.865	.748	1147.372	.000
Adaptive personalization	.630	.731	.534	443.950	.000
Knowledge reasoning	.628	.720	.519	417.749	.000
Data dependence	.562	.638	.407	266.039	.000
System integration	.530	.656	.430	292.470	.000
Learning analytics	.526	.597	.356	214.286	.000

DISCUSSION

The results indicate that Generative AI-ChatGPT postulates a meaningful connection with personalized learning in the UAE secondary schools. In the joint model, the variables accounted for a big share of the variance in personalized learning, so it seems teachers do not treat ChatGPT as just a writing utility. Rather they tend to see it as a kind of help mechanism for individualized learning, with technology integration, and with more flexible learning conversations. Natural interaction emerged as the strongest predictor of personalized learning in the present study. This finding suggests that teachers place considerable value on AI systems that enable clear, accessible, and contextually relevant communication. The ability of ChatGPT to facilitate natural language interaction may enhance instructional support, improve concept clarification, and promote more responsive learning experiences, thereby strengthening personalized learning practices. One possible explanation is that natural interaction reduces the technical barriers often associated with educational technologies, allowing both teachers and students to engage with the system using familiar language rather than specialized commands or complex interfaces. As a result, teachers can more easily generate explanations, provide differentiated support, answer student inquiries, and adapt instructional materials to meet diverse learning needs.

Furthermore, natural language interaction may contribute to greater learner engagement by creating a more interactive and supportive learning environment. Students can receive immediate responses, request alternative explanations, and seek clarification at their own pace, which aligns closely with the principles of personalized learning. These findings are consistent with previous studies suggesting that conversational AI tools enhance accessibility, learner autonomy, and instructional flexibility by supporting real-time communication and individualized assistance. In the UAE secondary school context, where schools continue to advance their digital transformation initiatives, the capacity of ChatGPT to facilitate meaningful and user-friendly interactions may explain why natural interaction demonstrated a stronger influence on personalized learning than other AI-related dimensions. This result highlights the importance of designing and implementing AI systems that prioritize usability, communication quality, and educational relevance to maximize their impact on teaching and learning outcomes. If a tool talks in a way teachers and learners can follow, then it is easier to put it to work for explanation, for clarification, for rephrasing questions, and for general learning support. So natural language interaction is not just decoration or a surface addition, it is at the core of ChatGPT's educational usefulness. System integration also mattered a lot in the combined model. This has a real message for school leaders. ChatGPT probably will not deliver steady, reliable benefits if it stays like a scattered informal tool that each teacher uses in a different way. The benefits grow when ChatGPT is tied into lesson planning, learning platforms, curriculum goals, assessment routines, and even institutional rules or guidance. Looking at the separate regression outputs, adaptive personalization, knowledge reasoning, data dependence, system integration, and learning analytics, each appear to matter on their own. But when all dimensions are put in together, only natural interaction and system integration keep independent statistical significance. This does not mean the other dimensions are pointless, it suggests their effects overlap and are absorbed by the stronger explanatory parts in the overall model. The descriptive results also cannot be ignored. Both "AI-ChatGPT use" and personalized learning practice were at a moderate level, not high.

Practical Implications

Implications for teachers

Teachers can utilize ChatGPT to generate alternative explanations, customized learning examples, practice exercises, and instructional prompts that support diverse learner needs. However, AI-generated content should be carefully reviewed before classroom implementation, as generated responses may occasionally contain inaccuracies or incomplete information. The findings suggest that ChatGPT should function as a supportive instructional tool that complements, rather than replaces, professional teacher judgment. Effective classroom use requires active teacher supervision, whereby educators establish learning objectives, evaluate AI-generated outputs, and guide students in assessing the accuracy, relevance, and educational value of the information provided.

Implications for school leaders

School leaders should approach AI adoption as a strategic institutional initiative rather than as the implementation of a standalone technology tool. The findings highlight system integration as a significant predictor of personalized learning, emphasizing the importance of embedding AI technologies within existing educational processes and digital infrastructures. Schools should establish clear policies for responsible AI use, provide ongoing professional development for teachers, and align AI applications with curriculum objectives and instructional practices. Furthermore, effective implementation requires consistent governance frameworks that address data privacy, academic integrity, quality assurance, and ethical use to ensure sustainable and educationally beneficial AI integration.

Implications for policymakers

Policy should really zoom in on responsible scale, not just say “use AI” and move on. It needs clear, almost practical guidance about data privacy, student AI literacy, teacher training, assessment integrity, and the way quality control is done for AI-supported educational content. The overall aim should not be to cram AI everywhere, instead it should be to apply it where it brings verified educational benefit.

Limitations and Future Research

This study does have limitations. For starters the findings rely on teachers, self-reported perceptions, which might not really mirror what happens day to day in actual classroom practice. Also, the cross-sectional design only captures responses at one moment, so it can’t really verify long term shifts in teaching behavior, or in student outcomes. And then there is the scope, since the study was carried out in UAE secondary schools, any attempt to generalize to other nations, or even different school levels should be handled with care. For future work, it would help to bring in student perspectives as well as classroom observations and real learning performance data. Longitudinal research could clarify whether AI supported personalized learning leads to lasting improvements in academic performance, critical thinking, independent learning, and digital literacy. Future studies could additionally look at teacher digital competence, institutional readiness, ethical governance, and prompt engineering skills, as these seem to influence how well AI gets integrated in practice.

CONCLUSION

This research article examines how Generative AI, specifically ChatGPT, influences personalized learning within the secondary education system of the United Arab Emirates. By surveying 389 teachers, findings found that dimensions like natural interaction and system integration are the most significant predictors of successful educational tailoring. The study reveals that while AI-ChatGPT and personalized practices are currently utilized at moderate levels, the technology explains a substantial 76% of the variance in customized instruction. The findings emphasize that ChatGPT serves as a powerful support mechanism for teachers when it is ethically guided and formally embedded into school frameworks. Ultimately, the authors advocate for robust policy development and professional training to ensure AI enhances rather than replaces human pedagogical judgment.

Declarations

Data availability: The data summarized in this article were drawn from the author's thesis dataset as reported in the thesis document. The raw dataset was not included in the thesis file provided for manuscript preparation.

Ethics statement: The thesis reported voluntary participation, informed consent, anonymity, confidentiality, and secure storage of responses. The study was conducted for academic research purposes.

Funding: The thesis reported that the study was not sponsored by any individual, group, or organization.

Conflict of interest: The author should confirm the final conflict-of-interest wording according to the selected journal's submission requirements.

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