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ChatGPT Acceptance and Use by Generation Z Pre-service Mathematics Teachers

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Abstract

Di era digital saat ini, teknologi pendidikan—khususnya alat berbasis AI seperti ChatGPT—menawarkan solusi inovatif untuk meningkatkan pembelajaran matematika. Studi ini mengeksplorasi bagaimana guru matematika prajabatan Generasi Z menerima dan menggunakan ChatGPT, dengan panduan dari kerangka TPB dan UTAUT2, serta meninjau peran gender dan tahun studi dalam membentuk perilaku mereka. Penelitian kuantitatif ini menggunakan survei potong lintang dengan 157 guru matematika prajabatan Generasi Z yang dipilih melalui teknik convenience sampling. Data dikumpulkan menggunakan kuesioner tervalidasi berdasarkan UTAUT dengan reliabilitas tinggi (a = 0,97). Analisis mencakup statistik deskriptif, korelasi Pearson, uji t, dan ANOVA untuk menguji penerimaan dan penggunaan ChatGPT berdasarkan gender dan tahun studi. Statistik deskriptif menunjukkan distribusi data yang normal, mendukung penggunaan uji parametrik. Koefisien Pearson mengungkap korelasi yang kuat dan signifikan antara niat berperilaku dan variabel seperti pengaruh sosial (r = 0,785) serta persepsi kontrol perilaku (r = 0,777). Penggunaan ChatGPT secara aktual paling berkorelasi dengan persepsi kontrol perilaku (r = 0,784) dan sikap (r = 0,738). Semua prediktor, termasuk harapan kinerja, harapan usaha, dan motivasi hedonik, menunjukkan hubungan positif dan signifikan, yang mendukung relevansi kerangka UTAUT2 dan TPB dalam menjelaskan adopsi ChatGPT di konteks pendidikan.

Abstract

In today's digital era, educational technology—particularly AI tools like ChatGPT—offers innovative solutions to enhance mathematics education. This study explores how Gen-Z pre-service mathematics teachers accept and use ChatGPT, guided by TPB and UTAUT2 frameworks, while also examining the roles of gender and year of study in shaping their behavior. This quantitative study used a cross-sectional survey with 157 Gen-Z pre-service mathematics teachers, selected via convenience sampling. Data were gathered using a validated questionnaire based on UTAUT, showing high reliability (a = 0.97). Analysis involved descriptive statistics, Pearson correlation, t-tests, and ANOVA to examine ChatGPT acceptance and use by gender and year of study. Descriptive statistics confirmed normal distribution, supporting parametric tests. Pearson coefficients revealed strong, significant correlations between behavioral intention and variables like social influence (r = 0.785) and perceived behavioral control (r =

0.777). Actual ChatGPT use was most correlated with perceived behavioral control (r = 0.784) and attitude (r = 0.738). All predictors, including performance expectancy, effort expectancy, and hedonic motivation, showed positive, significant relationships, supporting the relevance of UTAUT 2 and TPB frameworks in explaining ChatGPT adoption in educational contexts.

INTRODUCTION

In today's fast-evolving educational landscape, the integration of educational technology has become increasingly vital across all levels of schooling (Lalani, Crawford, & Butler-Henderson, 2025). Mathematics education, in particular, stands to gain significantly from such advancements. Traditionally regarded as a complex and abstract subject, mathematics often challenges students in ways that other disciplines may not (Mohamed, Hidayat, Suhaizi, Mahmud, & Baharuddin, 2022). Students frequently struggle with understanding abstract concepts, applying formulas, and making connections between theoretical and real-world applications. Educational technology offers innovative solutions to these challenges by providing interactive platforms, visual aids, simulations, and personalized feedback that can enhance student engagement and understanding (Hwang, & Tu, 2021). The emergence of artificial intelligence (AI), and more specifically ChatGPT, adds a new dimension to this evolution. ChatGPT, developed by OpenAI, is a conversational AI capable of generating human-like responses based on a vast dataset of text. Its capacity to solve mathematical problems, explain concepts step-by-step, and simulate discussions makes it a powerful tool in mathematics education (Qudratuddarsi, Fauziah, Agung, & Yanti, 2025).

The introduction of AI tools like ChatGPT into the learning environment brings new opportunities and also new responsibilities (Awang, Yusop, & Danaee, 2025; Richard, Vélez, & Van Vaerenbergh, 2022). While these tools are promising in their ability to personalize learning and provide on-demand assistance, their integration into formal education depends heavily on the teachers who facilitate and guide their use. Teachers are not just transmitters of knowledge—they are mediators, facilitators, and designers of learning experiences. As such, their willingness and ability to integrate AI tools into their

teaching are critical to the success of technology-enhanced education (Pepin, Buchholtz, & Salinas-Hernández, 2025; Wardat, Tashtoush, AlAli, & Jarrah, 2023). This is particularly true for pre-service teachers, who are currently in training and represent the future of the teaching profession. Among them, Generation Z (Gen-Z) pre-service teachers are a unique group to study. Born roughly between 1997 and 2012, Gen-Z individuals have grown up in a digital age (Qudratuddarsi, Hidayat, Nasir, Imami, & bin Mat Nor, 2022). They are familiar with smartphones, tablets, and the internet from a young age, making them technologically fluent in many ways (Merzifonluoglu, & Gunes, 2025). However, technological fluency does not necessarily equate to pedagogical readiness to use digital tools like ChatGPT in the classroom. Understanding their perceptions, attitudes, and intentions regarding the use of AI in education is thus of utmost importance (Chan, & Lee, 2023).

To investigate the acceptance and use of ChatGPT among Gen-Z pre-service mathematics teachers, this study utilizes two theoretical frameworks: the Theory of Planned Behavior (TPB) and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). TPB proposes that behavioral intention, which ultimately predicts actual behavior, is influenced by three primary components: attitude toward the behavior, subjective norms, and perceived behavioral control (Naskar, & Lindahl, 2025). Attitude refers to an individual's positive or negative evaluation of performing the behavior. Subjective norms relate to perceived social pressures, and perceived behavioral control refers to the ease or difficulty of performing the behavior, which can also directly affect behavior (Leung, & Cheung, 2025). On the other hand, UTAUT2 provides a more detailed analysis of the factors that influence technology acceptance and use. It includes performance expectancy (the degree to which the technology is perceived as beneficial), effort expectancy (the perceived ease of use), social influence, facilitating conditions (the degree to which users believe that organizational and technical infrastructure exists to support use), hedonic motivation (the fun or enjoyment derived from using the technology), and habit (the extent to which behavior has become automatic) (Ates, & Polat, 2025; Hu, Wang, & Xin, 2025).

Combining these two models provides a comprehensive framework for examining how various psychological, social, and contextual factors influence Gen-Z pre-service teachers' intentions and behaviors concerning ChatGPT. Despite the growing body of literature on technology integration in education, there is a noticeable gap when it comes to examining AI tools like ChatGPT specifically within the context of mathematics education. Moreover, most existing studies focus either on in-service teachers or on students at large, with limited research exploring how pre-service teachers, particularly those belonging to Gen-Z, perceive and use such technologies. Furthermore, the literature often neglects to account for individual differences such as gender or year of study, which may also influence acceptance and usage patterns. This creates a significant research gap that this study aims to fill. Therefore, the research questions for this study are: 1) What is the relationship between the key constructs of TPB and UTAUT2 in predicting the acceptance and use of ChatGPT among Generation Z pre-service mathematics teachers? (2) To what extent do gender and year of study influence the acceptance and use of ChatGPT among Generation Z pre-service mathematics teachers?

METHOD

This study adopted a quantitative research methodology, utilizing a cross-sectional survey design. A cross-sectional survey involves collecting data from a population—or a representative subset—at a single point in time (Kesmodel, 2018; Wang, & Cheng, 2020). This design is widely used in social science and educational research to assess prevailing attitudes, behaviors, opinions, or characteristics within a sample (Setia, 2016). It was chosen for its efficiency in capturing a broad snapshot of Generation Z pre-service mathematics teachers' acceptance and use of ChatGPT. Given the exploratory nature of the study—centered on perceptions, behavioral intentions, and usage patterns—the survey method enabled the systematic collection of standardized data suitable for quantitative analysis (Capili, 2021; Zangirolami-Raimundo, de Oliveira Echeimberg, & Leone, 2018).

Participants were selected using convenience sampling, which facilitated practical and efficient data collection (Golzar, Noor, & Tajik, 2022). The final sample consisted of 157 Generation Z pre-service mathematics teachers. As shown in Table 1, the gender distribution was predominantly female, with 111 participants (70.7%), while males accounted for 46 participants (29.3%). In terms of academic year, 44 respondents (28.03%) were first-year students, 42 (26.75%) were in their second year, and 71 (45.22%) were in their third year. This distribution reflects a fairly balanced representation across academic levels, albeit with a higher proportion of female participants.

Table 1. Distribution of sample

Sample	**N**	**Percentage**
Gender		
Male	46	29.3%
Female	111	70.7%
Year of study		
First year	44	28.03%
Second year	42	26.75%
Third year	71	45.22%
Total	157	100 %

The primary instrument utilized in this study was adapted from a previously validated questionnaire developed by Habibi et al. (2024), which examined user acceptance of ChatGPT as a technology-enhanced educational tool. As the original instrument was already available in Bahasa Indonesia and had been published in high-impact academic journals, no translation was required, thereby preserving both the semantic integrity and contextual relevance of the items. This instrument was considered highly appropriate for the current research due to its grounding in well-established theoretical frameworks, particularly the Unified Theory of Acceptance and Use of Technology (UTAUT2), which aligns closely with the study's objective. To ensure content validity, the adapted questionnaire was reviewed by two experts in mathematics education assessment, whose feedback confirmed that the items were suitable for the target population of pre-service teachers and effectively captured constructs related to technology use. The instrument demonstrated

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excellent reliability, with a Cronbach's alpha coefficient of 0.97, indicating a high level of internal consistency. This means that the items consistently measure the same underlying constructs, enhancing the dependability of the findings (Ahmed, & Ishtiaq, 2021; Cohen, Manion, & Morrison, 2017). The questionnaire included several constructs central to technology adoption: Performance Expectancy (4 items), Effort Expectancy (4 items), Social Influence (3 items), Facilitating Conditions, Hedonic Motivation (4 items), Habit (5 items), Attitude (4 items), Perceived Behavioral Control (3 items), Behavioral Intention (BI) (4 items), and ChatGPT Use (GPTU) (3 items). These constructs provided a comprehensive framework for assessing the acceptance and use of ChatGPT among future mathematics educators, strengthening the study's methodological foundation.

Data collection was conducted online using Google Forms, reflecting an environmentally conscious approach and offering efficient data management. The use of a digital platform facilitated organized data handling and minimized errors commonly associated with manual entry (Couper, 2017; Keusch, 2015). To ensure the clarity and reliability of responses, the researcher supervised the data collection process directly, encouraging participants to ask questions if they required clarification on any survey item. This interactive approach helped reduce misunderstandings and supported more thoughtful and accurate responses (Ponto, 2015). Participation in the study was entirely voluntary, and students were explicitly informed that their responses would have no impact on their academic evaluations. Emphasis was also placed on maintaining confidentiality and anonymity to promote honest and unbiased responses, thereby reducing the potential for social desirability bias (Griffin, Martino, LoSchiavo, Comer-Carruthers, Krause, Stults, & Halkitis, 2022). These ethical considerations were essential in preserving the integrity of the study and ensuring the authenticity of participants' perspectives. After data collection, responses were initially organized and cleaned using Microsoft Excel before being imported into SPSS version 25.0 for detailed statistical analysis.

Descriptive statistics, including mean, median, mode, standard deviation, skewness, and kurtosis, were calculated to explore the distribution and central tendencies of the data. Pearson correlation analysis was used to examine the strength and direction of relationships between constructs, applying Pearson's correlation coefficient as the statistical measure (Schober & Schwarte, 2018). Additionally, an independent samples t-test was conducted to assess the influence of gender on ChatGPT acceptance and use, while a one-way ANOVA was employed to analyze the impact of the year of study on these variables among Generation Z pre-service mathematics teachers.

RESULT AND DISCUSSION

Correlation Analysis

Correlation analysis is employed to assess the strength and direction of linear associations between two variables (Gogtay, & Thatte, 2017). In the context of technology acceptance research—such as this investigation into ChatGPT acceptance and usage among Generation Z pre-service mathematics teachers—it serves to identify how various psychological and contextual constructs (such as effort expectancy, habit, and attitude) are associated with behavioral intention and actual technology use. Prior to performing correlation analysis, it is important to first explore the fundamental characteristics of the dataset using descriptive statistics. These statistics summarize key aspects of the data, including measures of central tendency (mean), variability (standard deviation), and distribution patterns (skewness and kurtosis). Understanding these attributes helps determine whether the data meet the assumptions for correlation analysis, particularly with regard to approximate normality and sufficient variability, both of which are essential for producing valid and interpretable results.

Table 2. Descriptive Statistics

	Mean	SD	Skewness		Kurtosis	
Variable	Stat	Stat	Stat	Std. Err	Stat	Std. Err
Performance Expectancy	3.6003	.75525	-.575	.194	1.028	.385

Effort Expectancy	3.3567	.76858	-.293	.194	.351	.385
Social Influence	3.3546	.79858	-.167	.194	-.160	.385
Facilitating Condition	3.7102	.68670	-.328	.194	.685	.385
Hedonic Motivation	2.9809	.72917	.160	.194	.834	.385
Habit	3.6127	.68601	-.457	.194	.718	.385
Attitude	3.1338	.72198	-.005	.194	.181	.385
Perceived Behavioral Control	2.9130	.82702	-.112	.194	-.139	.385
Behaviour Intention	3.1194	.84901	-.178	.194	.207	.385
ChatGPT Use	2.8938	.80423	-.183	.194	-.162	.385

The descriptive statistics for the study variables reveal important insights into participants' perceptions and usage of ChatGPT. Among the constructs measured, Facilitating Conditions had the highest mean score (M = 3.71, SD = 0.69), indicating that participants generally agreed they had access to the necessary resources and support to use ChatGPT effectively. Habit (M = 3.61, SD = 0.69) and Performance Expectancy (M = 3.60, SD = 0.76) also received relatively high mean scores, suggesting that participants viewed ChatGPT as beneficial for enhancing learning performance and that its use was becoming a part of their routine behavior. In contrast, lower mean scores were observed for ChatGPT Use (M = 2.89, SD = 0.80), Perceived Behavioral Control (M = 2.91, SD = 0.83), and Hedonic Motivation (M = 2.98, SD = 0.73), indicating more neutral or uncertain attitudes regarding their ability to control, enjoy, or frequently engage with the platform.

The standard deviations across all variables ranged from approximately 0.68 to 0.85, suggesting a moderate level of variability in responses, with no signs of extreme dispersion. In terms of skewness, most variables showed slight negative skewness (e.g., Performance Expectancy = -0.575, Habit = -0.457), indicating that participants tended to respond more positively than negatively. Only Hedonic Motivation showed a slight positive skew (0.160), suggesting a small number of participants reported lower enjoyment in using ChatGPT. All skewness values were within acceptable limits (-1 to +1), indicating approximately symmetric distributions. The kurtosis values ranged from -0.16 to 1.03, with most constructs showing slight positive kurtosis, such as Performance Expectancy (1.03) and

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Habit (0.72), suggesting that responses were somewhat clustered around the mean. A few variables, like Social Influence and ChatGPT Use, showed near-zero or slightly negative kurtosis, indicating flatter, more evenly distributed responses. Overall, the data distribution for all variables was approximately normal, supporting the use of parametric statistical tests in subsequent analyses.

Pearson correlation coefficients were calculated to examine the relationships between key constructs from the TPB and UTAUT 2 frameworks and the two primary dependent variables: Behavioral Intention to use ChatGPT and Actual ChatGPT Use among Generation Z pre-service mathematics teachers. These coefficients offer insights into both the strength and direction of associations between each factor and participants' acceptance or usage of ChatGPT in an educational setting. Correlation values marked with asterisks (**) denote statistically significant relationships at the 0.01 level, indicating meaningful connections that merit further analysis and interpretation.

Table 3. Correlation Value of Each Variable

No.	Independent Variable	Dependent Variable	
		Behavioral Intention	ChatGPT Use
1	Performance Expectancy	0.556**	0.488**
2	Effort Expectancy	0.667**	0.591**
3	Social Influence	0.785**	0.665**
4	Facilitating Conditions	0.566**	0.447**
5	Hedonic Motivation	0.710**	0.684**
6	Habit	0.634**	0.494**
7	Attitude	0.727**	0.738**
8	Perceived Behavioral Control	0.777**	0.784**

Table 3 presents the Pearson correlation coefficients between the independent variables derived from the TPB and UTAUT 2 frameworks and the two key dependent variables: Behavioral Intention to use ChatGPT and Actual ChatGPT Use among Generation Z pre-service mathematics teachers. All correlation values are positive and statistically significant at the 0.01 level, indicating meaningful relationships between the independent variables and both

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behavioral intention and actual usage of ChatGPT in an educational context. Among the predictors, Social Influence (r = 0.785) and Perceived Behavioral Control (r = 0.777) showed the strongest correlations with Behavioral Intention, suggesting that the opinions of others and participants perceived ability to control their behavior play critical roles in shaping their intention to use ChatGPT. Attitude (r = 0.727) and Hedonic Motivation (r = 0.710) also demonstrated strong associations, highlighting the importance of positive feelings and enjoyment in technology acceptance.

In terms of actual ChatGPT use, Perceived Behavioral Control (r = 0.784) and Attitude (r = 0.738) were the most strongly correlated variables, implying that students who feel capable of using ChatGPT and have a favorable disposition toward it are more likely to use it in practice. Hedonic Motivation (r = 0.684) and Social Influence (r = 0.665) were also influential, reinforcing the idea that enjoyment and peer or instructor encouragement can motivate actual usage. Other variables such as Effort Expectancy, Habit, Performance Expectancy, and Facilitating Conditions also showed moderate to strong correlations with both intention and use, underscoring their collective relevance in understanding ChatGPT adoption. These results support the theoretical assumptions of TPB and UTAUT 2, emphasizing that a combination of personal, social, and environmental factors influence both the intention to use and the actual use of educational technology tools like ChatGPT.

The effect of Gender and Year of study on ChatGPT Acceptance and Use

To determine whether gender influences the acceptance and use of ChatGPT, an independent samples t-test was performed to compare male and female participants across the key constructs drawn from the TPB and UTAUT 2 frameworks. These constructs include performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, habit, attitude, perceived behavioral control, behavioral intention to use ChatGPT, and actual ChatGPT use. The findings, presented in Table 4, offer insights into

whether there are statistically significant differences between male and female pre-service mathematics teachers in terms of their perceptions and behaviors related to ChatGPT adoption. This analysis is essential for identifying potential gender-related differences, which can guide the development of more inclusive and equitable approaches to integrating AI-based learning tools in teacher education.

Table 4. Independent t-test result

No.	Variable	t-test	
		t	Sig
1	Performance Expectancy	1.547	0.124
2	Effort Expectancy	1.163	0.247
3	Social Influence	0.883	0.379
4	Facilitating Conditions	1.495	0.137
5	Hedonic Motivation	0.932	0.353
6	Habit	0.718	0.474
7	Attitude	1.240	0.217
8	Perceived Behavioral Control	1.204	0.230
9	Behavioral Intention to use GPT	0.827	0.410
10	ChatGPT Use	0.700	0.485

The independent samples t-test was conducted to examine whether there were statistically significant differences between male and female pre-service mathematics teachers in terms of their acceptance and use of ChatGPT, based on key variables from the TPB and UTAUT 2 frameworks. As shown in Table 4, none of the variables demonstrated significant gender differences, as all *p*-values (Sig.) exceeded the 0.05 threshold for statistical significance. For example, *Performance Expectancy* (t = 1.547, *p* = 0.124), *Effort Expectancy* (t = 1.163, *p* = 0.247), and *Social Influence* (t = 0.883, *p* = 0.379) showed no significant variation between male and female respondents. Similarly, no significant differences were found for constructs such as *Attitude* (t = 1.240, *p* = 0.217), *Behavioral Intention to Use ChatGPT* (t = 0.827, *p* = 0.410), or *Actual ChatGPT Use* (t = 0.700, *p* = 0.485). These findings suggest that gender does not play a statistically significant role in shaping the perceptions, intentions, or usage patterns of ChatGPT among Generation Z pre-service mathematics teachers. This outcome implies that both

male and female participants share relatively similar views and experiences regarding the adoption of AI-powered educational tools like ChatGPT.

To assess whether students' year of study affects their acceptance and use of ChatGPT, a one-way ANOVA was performed. This statistical method compares the mean scores across three or more independent groups—in this case, pre-service mathematics teachers at different academic levels—to identify any significant differences in their perceptions or usage patterns related to ChatGPT. The analysis covered a range of variables, including performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, habit, attitude, perceived behavioral control, behavioral intention, and actual use of ChatGPT. By examining these factors, the study aims to determine whether students' progression through their teacher education program influences how they engage with AI-driven educational tools.

Table 5. one-way ANOVA test result

No.	Variable	ANOVA test	
		F	sig
1	Performance Expectancy	0.375	0.688
2	Effort Expectancy	0.914	0.403
3	Social Influence	0.279	0.757
4	Facilitating Conditions	0.681	0.508
5	Hedonic Motivation	1.825	0.165
6	Habit	1.912	1.151
7	Attitude	0.185	0.831
8	Perceived Behavioral Control	0.917	0.402
9	Behavioral Intention to use GPT	1.199	0.304
10	ChatGPT Use	1.188	0.308

A one-way ANOVA was conducted to determine whether students' year of study (first, second, or third year) significantly influenced their acceptance and use of ChatGPT. The results, as presented in Table 5, show that none of the analyzed variables demonstrated statistically significant differences across the three-year levels, with all *p*-values (Sig.) exceeding the 0.05 threshold. For instance, *Performance Expectancy* (F = 0.375, *p* = 0.688), *Effort Expectancy* (F = 0.914,

p = 0.403), and *Social Influence* (F = 0.279, p = 0.757) revealed no significant variation in perception based on academic level. Similarly, no significant differences were found for *Behavioral Intention to Use ChatGPT* (F = 1.199, p = 0.304) or *Actual ChatGPT Use* (F = 1.188, p = 0.308). These findings suggest that the year of study does not have a meaningful impact on pre-service mathematics teachers' attitudes, intentions, or behaviors regarding ChatGPT usage. In other words, students across different academic levels tend to share similar perspectives and usage patterns when it comes to adopting AI tools in their learning environment.

Despite the valuable insights provided, this study has several limitations that should be acknowledged. First, the use of convenience sampling may limit the generalizability of the findings, as the sample might not fully represent the broader population of pre-service mathematics teachers in other institutions or regions. Second, the cross-sectional design captures perceptions and behaviors at only one point in time, which restricts the ability to assess how attitudes or usage patterns might evolve as students progress through their academic journey. Third, while the study utilized a robust, validated instrument, self-reported data are inherently susceptible to biases such as social desirability and misinterpretation of items.

CONCLUSION

In conclusion, this study contributes to a growing body of literature on AI integration in education by examining the acceptance and use of ChatGPT among Generation Z pre-service mathematics teachers using the TPB and UTAUT2 frameworks. The results highlight that all key constructs—such as Social Influence, Hedonic Motivation, Attitude, and Perceived Behavioral Control—are positively and significantly correlated with both behavioral intention and actual use of ChatGPT. However, variables such as gender and academic year do not significantly influence these relationships. This suggests that motivational and contextual factors, rather than demographic

characteristics, are more critical in shaping students' engagement with AI tools in education.

Practical implications of these findings include the need for teacher education programs to integrate AI tools like ChatGPT more systematically, ensuring that all students, regardless of academic standing or gender, have equal opportunities to engage with these technologies. Training modules should focus on enhancing students perceived behavioral control and attitude toward AI to foster greater adoption. Additionally, since social influence and hedonic motivation were strong predictors of usage, institutions could leverage peer collaboration and gamified learning environments to make the use of ChatGPT more engaging and socially supported.

DAFTAR PUSTAKA

Ahmed, I., & Ishtiaq, S. (2021). Reliability and validity: importance in medical research. *Methods*, *12*(1), 2401-2406.

Ates, H., & Polat, M. (2025). Exploring adoption of humanoid robots in education: UTAUT-2 and TOE models for science teachers. *Education and Information Technologies*, 1-42.

Awang, L. A., Yusop, F. D., & Danaee, M. (2025). Current practices and future direction of artificial intelligence in mathematics education: A systematic review. *International Electronic Journal of Mathematics Education*, *20*(2), em0823.

Bin Mohamed, M. Z., Hidayat, R., binti Suhaizi, N. N., bin Mahmud, M. K. H., & binti Baharuddin, S. N. (2022). Artificial intelligence in mathematics education: A systematic literature review. *International Electronic Journal of Mathematics Education*, *17*(3), em0694.

Capili, B. (2021). Cross-sectional studies. *AJN The American Journal of Nursing*, *121*(10), 59-62.

Chan, C. K. Y., & Lee, K. K. (2023). The AI generation gap: Are Gen Z students more interested in adopting generative AI such as ChatGPT in teaching and learning than their Gen X and millennial generation teachers? *Smart learning environments*, *10*(1), 60.

Cohen, L., Manion, L., & Morrison, K. (2017). Validity and reliability. In *Research methods in education* (pp. 245-284). Routledge.

Couper, M. P. (2017). New developments in survey data collection. *Annual review of sociology*, *43*(1), 121-145.

Golzar, J., Noor, S., & Tajik, O. (2022). Convenience sampling. *International Journal of Education & Language Studies*, *1*(2), 72-77.

Gogtay, N. J., & Thatte, U. M. (2017). Principles of correlation analysis. *Journal of the Association of Physicians of India*, *65*(3), 78-81.

Griffin, M., Martino, R. J., LoSchiavo, C., Comer-Carruthers, C., Krause, K. D., Stults, C. B., & Halkitis, P. N. (2022). Ensuring survey research data integrity in the era of internet bots. *Quality & quantity*, *56*(4), 2841-2852.

Hu, L., Wang, H., & Xin, Y. (2025). Factors influencing Chinese pre-service teachers' adoption of generative AI in teaching: an empirical study based on UTAUT2 and PLS-SEM. *Education and Information Technologies*, 1-23.

Hwang, G. J., & Tu, Y. F. (2021). Roles and research trends of artificial intelligence in mathematics education: A bibliometric mapping analysis and systematic review. *Mathematics*, *9*(6), 584.

Kesmodel, U. S. (2018). Cross-sectional studies–what are they good for? *Acta obstetricia et gynecologica Scandinavica*, *97*(4), 388-393.

Keusch, F. (2015). Why do people participate in Web surveys? Applying survey participation theory to Internet survey data collection. *Management review quarterly*, *65*(3), 183-216.

Lalani, K., Crawford, J., & Butler-Henderson, K. (2025). Academic leadership during COVID-19 in higher education: Technology adoption and adaptation for online learning during a pandemic. *International Journal of Leadership in Education*, *28*(1), 1-17.

Leung, L., & Cheung, M. (2025). The effects of technology readiness, risks, and benefits on smart home technology adoption: extending the Theory of Planned Behavior model. *Media Asia*, *52*(1), 80-101.

Habibi, A., Mukminin, A., Octavia, A., Wahyuni, S., Danibao, B. K., & Wibowo, Y. G. (2024). ChatGPT acceptance and use through UTAUT and TPB: A big survey in five Indonesian universities. *Social Sciences & Humanities Open*, *10*, 101136.

Hu, L., Wang, H., & Xin, Y. (2025). Factors influencing Chinese pre-service teachers' adoption of generative AI in teaching: an empirical study based on UTAUT2 and PLS-SEM. *Education and Information Technologies*, 1-23. Merzifonluoglu, A., & Gunes, H. (2025). Shifting Dynamics: Who Holds the Reins in Decision-Making with Artificial Intelligence Tools? Perspectives of Gen Z Pre-Service Teachers. *European Journal of Education*, *60*(1), e70053.

Naskar, S. T., & Lindahl, J. M. M. (2025). Forty years of the theory of planned behavior: a bibliometric analysis (1985–2024). *Management Review Quarterly*, 1-60.

Ponto, J. (2015). Understanding and evaluating survey research. *Journal of the advanced practitioner in oncology*, *6*(2), 168.

Pepin, B., Buchholtz, N., & Salinas-Hernández, U. (2025). A scoping survey of ChatGPT in mathematics education. *Digital Experiences in Mathematics Education*, 1-33.

Qudratuddarsi, H., Fauziah, A., Agung, A., & Yanti, M. (2025). "Status quo" chatgpt dalam pengajaran dan pembelajaran fisika: systematic literature review. *PHYDAGOGIC: Jurnal Fisika dan Pembelajarannya*, *7*(2), 110-118.

Qudratuddarsi, H., Hidayat, R., Nasir, N., Imami, M. K. W., & bin Mat Nor, R. (2022). Rasch validation of instrument measuring Gen-Z science, technology, engineering, and mathematics (STEM) application in teaching during the pandemic. *International Journal of Learning, Teaching and Educational Research*, *21*(6), 104-121.

Richard, P. R., Vélez, M. P., & Van Vaerenbergh, S. (2022). Mathematics education in the age of artificial intelligence. *How artificial intelligence can serve the mathematical human learning*.

Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian journal of dermatology*, *61*(3), 261-264.

Wang, X., & Cheng, Z. (2020). Cross-sectional studies: strengths, weaknesses, and recommendations. *Chest*, *158*(1), S65-S71.

Wardat, Y., Tashtoush, M. A., AlAli, R., & Jarrah, A. M. (2023). ChatGPT: A revolutionary tool for teaching and learning mathematics. *Eurasia Journal of Mathematics, Science and Technology Education*, *19*(7), em2286.

Zangirolami-Raimundo, J., de Oliveira Echeimberg, J., & Leone, C. (2018). Research methodology topics: Cross-sectional studies. *Journal of Human Growth and Development*, *28*(3), 356-360.