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The Role of Affective, Behavioural and Cognitive Components of Attitude Towards ChatGPT in Enhancing Academic Motivation among University Students

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ABSTRACT This study examines whether the affective, cognitive, and behavioural components of students' attitude towards ChatGPT are associated with their academic motivation. Using a cross-sectional design, data were collected from a stratified random sample of 550 students across different academic disciplines at a university in Saudi Arabia. The data were analysed using confirmatory factor analysis and structural equation modelling. The findings show that the affective, cognitive, and behavioural components of attitudes towards ChatGPT have significant positive effects on academic motivation, with the behavioural component emerging as the most influential. Moreover, a strong positive relationship was identified between students' academic motivation and their overall attitudes towards ChatGPT. These results indicate that ChatGPT could be a valuable tool for supporting learning when used appropriately in higher education.

INTRODUCTION

Generative artificial intelligence (GenAI) is becoming increasingly embedded in education, introducing tools that are changing how teaching and learning are approached across different educational settings. Among these, ChatGPT, a large language model, was launched in 2022 by OpenAI. ChatGPT conducts dialogues similar to human interaction and provides instant access to information, facilitating quick knowledge acquisition (OpenAI 2023). The incorporation of ChatGPT into education aligns with the broader global trend of digital transformation in this sector and has attracted considerable interest from educators and students alike. Such tools enhance students' learning autonomy, enable them to understand concepts, and provide opportunities for immediate interaction and feedback when needed. According to Sandu et al. (2024), ChatGPT has redefined how students interact with learning content, teachers, and peers, contributing to greater flexibility and innovation in learning environments. However, it is worth noting that the value of GenAI technologies extends beyond their technical functionality and depends on how students engage with them in meaningful and appropriate ways.

The widespread adoption of GenAI tools, including ChatGPT, has sparked ongoing discussions among scholars about their long-term implications for students' cognitive development and learning autonomy. Several scholars argue that such tools offer considerable opportunities to enhance access to learning, provide timely academic support, and boost students' achievement (Létourneau et al. 2025; Wang et al. 2024). They could provide personalised assistance and support diverse learner needs, particularly in large classroom settings, where learning resources are limited (Alqahtani et al. 2024). Furthermore, ChatGPT facilitates self-directed learning and enhances students' confidence by providing private, non-judgemental support (Abdullayeva and Musayeva 2023; Ausat et al. 2023; Ravšelj et al. 2025). Yet concerns have been raised about over-reliance on artificial intelligence (AI) generated responses, which may reduce students' engagement in deep cognitive processing and weaken their capacity for independent problem-solving (Gerlich 2025; Jose et al. 2025). Issues such as plagiarism, inaccurate or misleading information, and the challenges of distinguishing between human- and AI-generated content have prompted further discussion of the pedagogical and ethical implications

of these technologies (Fuchs 2023). These varied perspectives indicate that the educational efficacy of ChatGPT is not intrinsic to the tool itself but is driven by the pedagogical design, patterns of student engagement, and the level of instructional guidance provided.

Academic motivation is identified as a critical factor influencing students' engagement with AI-supported learning environments. Academic motivation refers to the internal processes that promote and guide learners' behaviour towards achieving educational goals, including persistence, effort, and self-regulation (Schunk et al. 2014). Students with higher levels of academic motivation are often more willing to exert greater effort into learning tasks, adapt to new learning technologies, and remain engaged despite academic challenges. Self-determination theory provides a useful lens for understanding academic motivation by differentiating motivation that arises from interest and enjoyment from motivation shaped by external consequences, including rewards and the avoidance of negative outcomes (Ryan and Deci 2000). From this perspective, students are more likely to become motivated and remain engaged when the learning environment supports their sense of autonomy, competence, and belonging (Deci and Ryan 2000). Before considering its motivational role, recent literature has highlighted ChatGPT as a transformative educational technology with the potential to personalise learning, provide timely feedback, enhance student engagement, and support more flexible learning experiences in higher education (Li 2024). In this context, ChatGPT may help satisfy these psychological needs by encouraging self-directed learning and providing continuous learning support, thereby enhancing students' academic motivation. Consistent with this view, Hamid and Fadila (2024) and Mabrouk (2024) reported that GenAI tools can enhance students' motivation by facilitating understanding, providing timely feedback, and encouraging learners to assume greater responsibility for their own learning. Afzaal et al. (2025) similarly emphasised that such benefits depend on how the technology is used, as ChatGPT is more likely to support motivation when it complements students' own thinking rather than replaces it. Likewise, studies conducted in different educational contexts demonstrate that students generally perceive ChatGPT as useful, accessible, and engaging, perceptions that encourage its integration into learning activities and may indirectly support academic motivation (Le et al. 2024; Siregar et al. 2023). Taken together, this evidence suggests that the motivational value of ChatGPT may lie in its capacity to support active involvement, learner independence, and purposeful engagement with academic work.

However, the extent to which ChatGPT supports academic motivation may vary across learners depending on individual and contextual factors. Previous research indicates that students in technically oriented or high-workload disciplines tend to rely more heavily on AI-supported learning tools than those in humanities disciplines, reflecting differences in learning demands and task requirements (Alnaim et al. 2024; Ravšelj et al. 2025; Scherer et al. 2019). Likewise, students with stronger digital competence have been found to report higher levels of motivation and satisfaction when using ChatGPT to support their learning (Siregar et al. 2023). Therefore, the motivational benefits associated with ChatGPT are influenced by learners' characteristics, disciplinary contexts, digital competence, and the educational purposes for which the technology is used.

Despite these potential benefits, recent research has also highlighted important concerns regarding the educational use of GenAI. Although ChatGPT can facilitate learning, enhance engagement, strengthen academic confidence, and help reduce students' academic stress and anxiety (Saif et al. 2024a), excessive reliance on the technology may encourage cognitive offloading, thereby reducing opportunities for independent reasoning and deeper cognitive processing (Gerlich 2025). Excessive dependence may also become problematic when ChatGPT begins to take the place of independent learning, potentially limiting students' creativity and fostering reliance on the technology (Saif et al. 2024b). Collectively, these contrasting findings indicate that the educational value of ChatGPT cannot be viewed as inherently beneficial or harmful. Rather, its influence on academic motivation depends on how students use the technology, the purposes for which they employ it, and the individual and contextual conditions surrounding its use.

Moreover, students' attitudes towards educational technology play a primary role in shaping their technology use patterns. Ajzen (2005) defined attitudes as acquired psychological predispositions that influence how individuals evaluate and respond to particular objects, which is reflected in their future decisions and behaviours. In educational contexts, positive attitudes towards technology have been consistently linked to higher levels of technology acceptance, continued use, and integration into learning practices (Sallam et al. 2024; Venkatesh et al. 2012). Studies on ChatGPT suggest that students' attitudes towards the tool are shaped by factors beyond usefulness and accessibility, including trust, perceived risks, and confidence in AI-supported learning (Ravšelj et al. 2025; Sallam et al. 2024). In Saudi higher education, students have generally reported favourable perceptions of ChatGPT and high levels of acceptance, with usefulness and ease of use playing an important role in adoption (Alotaibi et al. 2025; Sobaih et al. 2024). These attitudes may also change over time as students become more familiar with GenAI and develop a clearer understanding of its educational value (Williams 2026). According to Triandis (1971), attitudes comprise three interconnected affective, behavioural and cognitive components. In relation to technology use, the affective component refers to individuals' feelings and emotional responses towards technology. The behavioural component reflects their willingness or intention to use it, and the cognitive component concerns their beliefs and perceptions about its characteristics and benefits (Oskamp and Schultz 2005). A recent study by Cabero-Almenara et al. (2026) has demonstrated that students' attitudes towards AI technologies are multidimensional, with cognitive and behavioural components often emerging as particularly influential in shaping educational use and acceptance. This multidimensional perspective is particularly relevant in the context of ChatGPT, as students may simultaneously hold beliefs about its usefulness, experience positive or negative emotions towards its use, and develop behavioural tendencies regarding its adoption in learning activities. Examining these components separately may, therefore, provide a more comprehensive understanding of how attitudes influence students' motivation in AI-supported learning environments. Understanding the interaction among these components is particularly important for explaining variations in students' motivational engagement in digitally mediated learning environments.

Students' attitudes towards educational technology are closely associated with their academic motivation and engagement in learning (An et al. 2024). Students with positive attitudes towards technology are more willing to adopt and interact with such tools in educational activities, which contributes to increased participation and continued learning. Previous research has consistently shown that positive attitudes towards educational technologies are associated with greater technology acceptance, sustained use, higher motivation, and greater willingness to engage in digitally mediated learning activities (Scherer et al. 2019; Venkatesh et al. 2012). However, it remains unclear whether these relationships extend to emerging AI-powered tools such as ChatGPT and whether the affective, cognitive, and behavioural components of attitudes contribute equally to students' academic motivation. Despite the growing body of research on the applications of GenAI in education, existing studies have primarily focused on technology acceptance, perceived usefulness, and the impact of AI tools on learning outcomes (Ravšelj et al. 2025; Sallam et al. 2024). Less attention has been given to understanding students' attitudes towards specific AI applications, such as ChatGPT, as multidimensional constructs comprising affective, cognitive, and behavioural components. Previous studies have established the relevance of attitude to technology use and engagement, yet its individual dimensions are often collapsed into a single construct. Consequently, the extent to which each dimension is independently related to academic motivation remains insufficiently understood (Cabero-Almenara et al. 2026).

The importance of addressing this gap becomes particularly evident in higher education systems undergoing rapid digital transformation. In Saudi Arabia, universities are increasingly incorporating advanced digital and AI tools into teaching and learning processes as part of national initiatives aligned with Vision 2030 and the transition towards a knowledge-based economy (SDAIA 2024). These national priorities are

further reinforced by the Human Capability Development Program, which emphasises strengthening digital capabilities, promoting innovation in education, and equipping graduates with the skills needed for the future knowledge economy (Saudi Vision 2030 2026). Recent evidence also suggests growing interest in the educational use of ChatGPT in Saudi higher education, particularly as a tool to support learning, improve access to information, and enhance students' learning experiences (Faisal 2024). Although preliminary evidence suggests that students recognise the potential value of tools such as ChatGPT in supporting learning activities, there remains a lack of empirical research explaining how different dimensions of students' attitudes towards these tools relate to their academic motivation. To address this gap, the present study investigates the relationship between the affective, cognitive, and behavioural components of attitudes towards ChatGPT and students' academic motivation within the context of Saudi higher education. The findings may also inform the effective integration of GenAI in higher education.

Objectives

This study aims to examine the relationship between the components of students' attitudes towards the use of ChatGPT and their academic motivation. Specifically, it investigates the extent to which the affective, cognitive, and behavioural components of attitudes towards ChatGPT influence students' academic motivation in higher education contexts.

Based on the above objectives, the following hypotheses are intended to be validated from the perspective of Saudi Arabian higher education:

H1: The affective component of attitudes towards ChatGPT has a significant positive effect on students' academic motivation.

H2: The cognitive component of attitudes towards ChatGPT has a significant positive effect on students' academic motivation.

H3: The behavioural component of attitudes towards ChatGPT has a significant positive effect on students' academic motivation.

H4: Overall attitudes towards ChatGPT have a significant positive effect on students' academic motivation.

METHODOLOGY

Research Design

The study used a quantitative design to examine the relationships between the affective, cognitive, and behavioural components of attitudes towards using ChatGPT and students' academic motivation. A deductive approach was followed, in which hypotheses were developed from the existing literature and tested using empirical data. Data were collected through a cross-sectional survey based on a questionnaire administered to university students. This approach is consistent with a positivist perspective, which emphasises the use of statistical analysis to examine relationships between variables (Creswell and Creswell 2017).

Research Instrument

Data were collected using a questionnaire with closed-ended items measured on a three-point Likert scale. This scale was used to keep the response options clear and easy for participants, which helps reduce confusion and improves consistency in their answers.

The questionnaire included two main sections for attitudes towards ChatGPT and academic motivation. Attitudes towards ChatGPT were measured across three dimensions of affective (5 items), cognitive (6 items), and behavioural (6 items), adapted from Ajlouni et al. (2023). Academic motivation was measured using 24 items adapted from Elsayed and Alharbi (2014).

Sampling and Population

The target population comprised university students in the Eastern Province of Saudi Arabia, enrolled across both humanities and scientific disciplines, with an estimated population size of 102,104 students. Stratified random sampling was used so that the sample represented students across gender, academic major, grade point average (GPA), and academic level. The final sample consisted of 550 respondents, in-

cluding both male and female students. The minimum required sample size was determined using Thompson's formula as follows:

$$n = \frac{N \times p(1-p)}{(N-1)\left(\frac{d^2}{z^2}\right) + p(1-p)} \qquad n = \frac{102104 \times 0.50(1-0.50)}{(102104-1)\left(\frac{0.05^2}{1.96^2}\right) + 0.50(1-0.50)}$$

Where, $n = 382.723$

The obtained sample size therefore exceeds the recommended minimum, supporting the adequacy of the data for statistical analysis.

Data Analysis Tools

Data were analysed using SPSS (version 25) and IBM SPSS Amos (version 24). The analysis involved descriptive statistics, confirmatory factor analysis (CFA), and structural equation modelling to evaluate the measurement model and test the hypothesised relationships among the study variables.

RESULTS

Descriptive Statistics

To contextualise the findings, the participants' demographic characteristics are presented in Table 1. The study included a total of 550 participants. Male respondents constituted a larger proportion of the sample (63.6%) than female respondents (36.4%). In terms of academic majors, students from the humanities represented the largest group (27.3%), followed by those in scientific and engineering fields (21.8% each), health (20.0%), and business administration (9.1%). Regarding GPA, the majority of respondents reported a 'Good' classification (34.5%), while equal proportions were observed in the 'Excellent' and 'Very Good' categories (29.1% each). A smaller percentage fell within the 'Acceptable' category (7.3%). In terms of academic level, the sample was largely composed of first-year students (40.0%), followed by third-year (20.0%), fourth-year (18.2%), and fifth-year students (16.4%), while second-year students represented a relatively small proportion (5.5%). Overall, the sample reflects a reasonable degree of diversity across demographic characteristics. However, the higher representation of first-year students should be considered when interpreting the results.

Table 1: Descriptive statistics of respondents (N=550)

Characteristic	*Category*	*N*	*%*
Gender	Male	350	63.6
	Female	200	36.4
Major	Humanities	150	27.3
	Scientific	120	21.8
	Health	110	20.0
	Engineering	120	21.8
	Business Administration	50	9.1
GPA	Excellent	160	29.1
	Very Good	160	29.1
	Good	190	34.5
	Acceptable	40	7.3
Academic Level	First	220	40.0
	Second	30	5.5
	Third	110	20.0
	Fourth	100	18.2
	Fifth	90	16.4

Confirmatory Factor Analysis of Attitudes Towards using ChatGPT

To examine the construct validity of the attitudes scale towards the use of ChatGPT as an educational tool, CFA was conducted in Amos 24. The scale consisted of 17 items distributed across three dimensions of affective, cognitive, and behavioural.

Table 2 presents the model fit indices. The fit indices provide evidence that the proposed measurement model fits the observed data well. Specifically, the comparative fit index (CFI) at .991 and normed fit index (NFI) at .961 exceed the commonly accepted thresholds (Hair et al. 2019;

Table 2: Confirmatory factor analysis fit indices for the attitude toward the use of ChatGPT (3 factors)

Conformity indicators		*Convergence indicators*	*Indicators of lack of economy*					*Absolute matching indicators*			
NFI	*PNFI*	*CFI*	*CAIC*	*AIC*	*RMSEA*	*AGFI*	*GFI*	*RMR*	*CMIN/df*	*df*	*CMIN*
.961	.819	.991	419.347	222.881	.023	.959	.969	.015	1.283	116	148.881

Hu and Bentler 1999), while the root mean square error of approximation (RMSEA) at .023 falls well below the recommended cut-off value of .06, indicating a close fit (Hu and Bentler 1999). In addition, other indices, including the goodness-of-fit index (GFI) of .969 and the adjusted goodness-of-fit index (AGFI) of .959, further support the model's adequacy (Hair et al. 2019).

Overall, these findings provide strong evidence for the construct validity of the attitudes scale, indicating that the three-factor structure effectively captures students' attitudes towards using ChatGPT in an educational context.

Confirmatory Factor Analysis of Academic Motivation

A CFA was also conducted to assess the construct validity of the academic motivation scale using Amos 24. The scale included 24 items across two dimensions of learning orientation and perseverance.

As shown in Table 3, the model fit indices indicate a good fit. The CFI of .993 and NFI of .948 are both within acceptable ranges (Hair et al. 2019; Hu and Bentler 1999), while the RMSEA of .017 indicates an excellent fit, as values below .06 are generally considered indicative of a close-fitting model (Hu and Bentler 1999). Additional indices, such as the GFI (.957) and AGFI (.949), further confirm the model's suitability (Hair et al. 2019).

These results suggest that the two-factor structure of academic motivation provides a valid representation of the construct in this study, supporting its use in subsequent analysis.

Reliability and Validity

Table 4 presents the factor loadings, reliability coefficients, and average variance extracted (AVE) values for all constructs. As shown in Table 4, the factor loadings for all items fall within acceptable ranges, from moderate to high values, indicating that the items are adequately associated with their respective constructs. As suggested in the literature, factor loadings above .50 are generally considered acceptable, while higher values indicate stronger relationships (Hair et al. 2019). For instance, the item 'I feel comfortable using ChatGPT for learning tasks' demonstrates a strong loading (.771) on the affective dimension, and cognitive items such as 'ChatGPT makes the learning process easier' (.792) also show good representation of their construct. Similarly, the behavioural items exhibit consistent loadings, suggesting that they reliably reflect students' intended use of ChatGPT.

In terms of reliability, all constructs yielded Cronbach's alpha coefficients above .70, providing evidence of satisfactory internal consistency (George and Mallery 2024). Specifically, the affective construct shows a reliability value of .815, while both the cognitive and behavioural constructs demonstrate strong reliability at .859. Likewise, the academic motivation dimensions of learning orientation (.904) and perseverance (.900) exhibit high internal consistency.

Composite reliability (CR) values further support these findings, as all constructs exceed the recommended level of .70, confirming the reliability of the measurement model (Hair et al. 2019).

Regarding convergent validity, the AVE values for the ChatGPT attitude constructs are close to or above the recommended threshold of .50, indicating an acceptable level of explained variance (Fornell and Larcker 1981). Although the AVE values for the academic motivation dimensions are slightly below the preferred level, they remain within an acceptable range when considered alongside the strong reliability coefficients and factor loadings, as acknowledged in prior research (Hair et al. 2019; Kline 2023).

Overall, these findings suggest that the measurement scales demonstrate acceptable reliabil-

Table 3: Confirmatory factor analysis indices for academic motivation (2 factors)

Conformity indicators		*Convergence indicators*	*Indicators of lack of economy*					*Absolute matching indicators*			
NFI	*PNFI*	*CFI*	*CAIC*	*AIC*	*RMSEA*	*AGFI*	*GFI*	*RMR*	*CMIN/df*	*df*	*CMIN*
.948	.862	.993	648.008	387.822	.017	.949	.957	.012	1.155	251	289.822

Table 4: Factor loadings, validity and reliability

Construct	*Items*	*Factor loadings*	*Cronbach's Alpha*	*Composite Reliability (CR)*	*AVE*
Affective	Aff1: I enjoy using ChatGPT in the learning process.	.746	.815	.817	.473
	Aff2: I feel comfortable using ChatGPT for learning tasks.	.771			
	Aff3: I feel annoyed when using ChatGPT because there is no human interaction.	.646			
	Aff4: I feel concerned about using ChatGPT to complete school assignments because it may lead to inaccurate results.	.659			
	Aff5: I feel stressed due to the difficulty of accessing ChatGPT services.	.604			
Cognitive	CO1: Skills related to using ChatGPT in learning are essential for me.	.706	.859	.860	.507
	CO2: ChatGPT makes the learning process easier.	.792			
	CO3: ChatGPT improves learning experience.	.692			
	CO4: ChatGPT meets my individual learning needs.	.664			
	CO5: ChatGPT supports lifelong learning.	.723			
	CO6: ChatGPT helps improve my higher-order skills (such as creative thinking).	.687			
Behavioural	BE1: I will keep up with improvements and updates in ChatGPT.	.759	.859	.860	.506
	BE2: I will inform friends and colleagues about the benefits of using ChatGPT in learning.	.696			
	BE3: I will use ChatGPT to complete my academic tasks.	.679			
	BE4: I will use ChatGPT for practice and exam preparation.	.714			
	BE5: I will use ChatGPT to summarize and analyze learning materials.	.714			
	BE6: I will continue using ChatGPT to achieve my educational goals.	.702			
Learning Orientation	TS1: I feel a strong motivation or inclination toward an activity when it is challenging.	.711	.904	.904	.439
	TS2: I feel that academic excellence is an easy process for me.	.648			
	TS3: I seek to explore and browse scientific websites related to my field of study.	.646			
	TS21: I strive to take additional scientific and training courses related to my specialization.	.619			
	TS22: Challenging activities attract me more than easy ones.	.676			
	TS23: I feel capable of succeeding in any academic activity I undertake.	.652			
	TS24: I enjoy attempting to solve problems that others consider impossible.	.659			
	TS25: I strive to achieve more accomplishments in my life.	.663			
	TS26: I feel that studying is an activity I enjoy doing.	.676			
	TS27: I believe that a life in which a person does not work at all is an imperfect life.	.665			

Table 4: Contd...

Construct	*Items*	*Factor loadings*	*Cronbach's Alpha*	*Composite Reliability (CR)*	*AVE*
	TS28: When I work, my sense of responsibility toward myself is very high.	.653			
	TS29: I usually engage in my academic activities much more than I had planned.	.681			
Perseverance	PE30: I continue my studies even when they seem difficult.	.656	.900	.901	.432
	PE31: When I engage in an academic task, I like to complete it to the end.	.695			
	PE32: I like to reach a solution to any problem I encounter, no matter how long it takes.	.690			
	PE33: Unfinished tasks bother me until I complete them.	.694			
	PE34: I prefer attempting challenging tasks rather than continuing with easy ones.	.617			
	PE35: Success in a task encourages me to attempt a more difficult one.	.602			
	PE36: I find it necessary to complete any task I start regardless of the difficulties I face.	.693			
	PE37: I can work for long periods without feeling tired.	.681			
	PE38: I exert my utmost effort to achieve my goals.	.665			
	PE39: I like performing activities that involve high levels of responsibility.	.598			
	PE40: I enjoy performing challenging activities.	.621			
	PE41: I strive to overcome all obstacles that stand in the way of achieving my goals.		.668		

Note: All factor loadings are significant at $p < .001$. CR = Composite Reliability; AVE = Average Variance Extracted

ity and validity, supporting their suitability for examining the relationship between attitudes towards ChatGPT and academic motivation.

Structural Model Results

Tables 5 and 6 provide an overview of the model fit and the structural relationships among the study variables. As shown in Table 5, the overall model demonstrates a good fit to the data. The Chi-square minimum discrepancy (CMIN) value is 960.344 with 774 degrees of freedom (df), resulting in a CMIN/df ratio of 1.241, which falls well within the recommended threshold of ≤ 3, indicating a satisfactory model fit (Kline 2023). Additionally, the GFI (.907) and AGFI (.901) both exceed the acceptable level of .90 (Hair et al. 2019), suggesting that the model adequately represents the observed data. The RMSEA value of .021 further supports this conclusion, as values below .06 indicate a close fit (Hu and Bentler 1999). Similarly, the CFI of .980 and NFI of .906 both exceed the recommended thresholds, providing further evidence of the model's adequacy (Hair et al. 2019). Overall, these indices collectively indicate that the proposed model fits the data well and does not require substantial modification.

Table 6 presents the results of testing the first three hypotheses concerning the effects of the affective, cognitive, and behavioural components on academic motivation. The findings reveal that all three components have a significant positive effect on academic motivation. Specifically, the affective component shows a positive and statistically significant relationship (â = .213, SE = .048, CR = 3.890, $p < .001$), supporting H1. Similarly, the cognitive component demonstrates a strong and significant effect (β = .369, SE = .046, CR = 6.378, $p < .001$), leading to the acceptance of H2. The behavioural component also exhibits a significant positive influence (β = .395, SE = .044, CR = 7.286, $p < .001$), supporting H3. As illustrated in Figure 1, all three components demonstrate significant positive effects on academic motivation. These results indicate that students' attitudes towards using ChatGPT, across affective, cognitive, and behavioural dimensions, play a meaningful role in enhancing their academic motivation.

Table 7 presents the correlations among the key constructs. The results indicate moderate positive relationships between the affective component and both cognitive (r = .471) and behavioural (r = .420) components. A similar pattern is observed between cognitive and behavioural dimensions (r = .458), suggesting a consistent level of association among the three components of attitude. Regarding academic motivation, all components show moderate-to-strong positive correlations, with coefficients of .492 for affective, .568 for cognitive, and .566 for behavioural. These findings suggest that higher levels of engagement across these dimensions are associated with increased academic motivation and indicate that the constructs are related yet conceptually distinct.

Table 8 further confirms the adequacy of the final model. The CMIN/df value (1.241) remains well within the acceptable range, while the GFI (.907), CFI (.980) and Tucker-Lewis index (.979) all exceed the recommended threshold of .90, indicating a strong model fit. The RMSEA value of .021 reflects an excellent level of approxima-

Table 5: Fit indices for SEM model with 3 independent variables

CMIN	*df*	*CMIN/df*	*GFI*	*AGFI*	*RMSEA*	*CFI*	*NFI*
960.344	774	1.241	.907	.901	.021	.980	.906

Table 6: Results of testing the first three hypotheses (H1-H3)

Independent variable	*Path*	*Dependent variable*	*(Estimate) â*	*S.E*	*C.R.*	*Sig.*	*Result*
Affective	→	Academic motivation	.213	.048	3.890	***	Supported
Cognitive	→	Academic motivation	.369	.046	6.378	***	Supported
Behavioural	→	Academic motivation	.395	.044	7.286	***	Supported

*** Significant at a significance level less than (0.001)

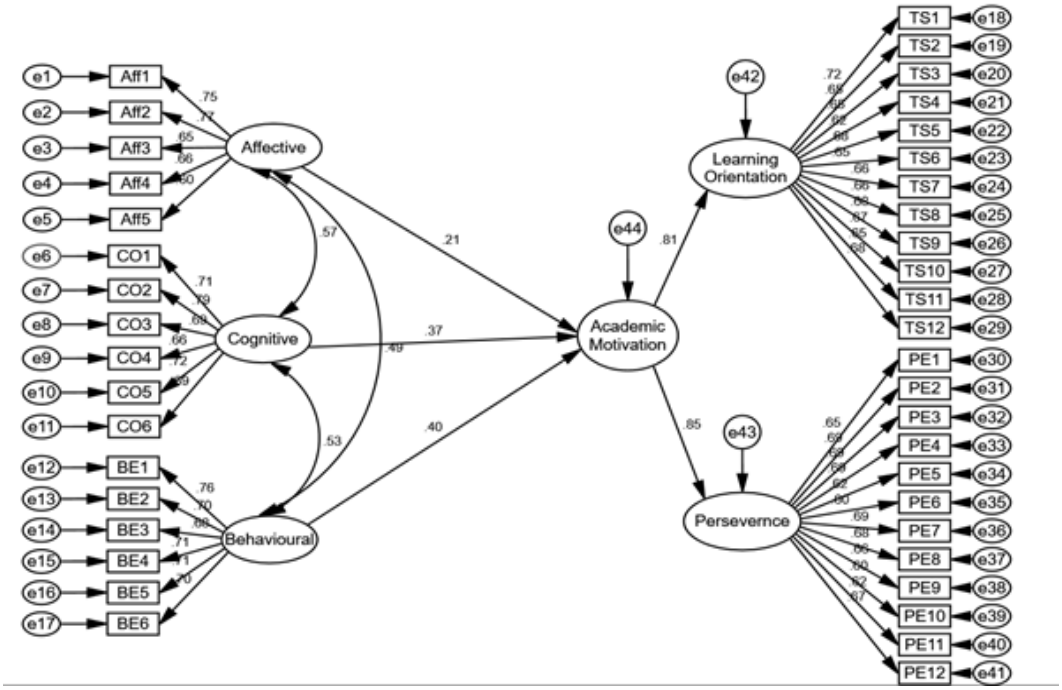


Fig. 1. CB-SEM structural model of the relationships between affective, cognitive and behavioural components and academic motivation (H1-H3)

Table 7: Correlation among the variables

	Affective	*Cognitive*	*Behavioural*	*Academic motivation*
Affective	—	.471	.420	.492
Cognitive	.471	—	.458	.568
Behavioural	.420	.458	—	.566
Academic Motivation	.492	.568	.566	—

Table 8: Fit indices for the final model of the attitude toward the use of ChatGPT and Academic Motivation

Model indicators	*Standard value*	*Value*	*Judgment*	
Model Indicators	CMIN	—	960.344	—
	df	—	774	—
	CMIN/df	≤ 3.0	1.241	Acceptable
Absolute Matching Indicators	GFI	≥ 0.90	.907	Acceptable
Indicators Of Lack Of Economy	RMSEA	≤ 0.08	.021	Acceptable
Comparative Conformity Indicators	CFI	≥ 0.90	.980	Acceptable
	TLI	≥ 0.90	.979	Acceptable
	PNFI	≥ 0.50	.855	Acceptable

tion. In addition, the parsimonious normed fit index (.855) exceeds the minimum acceptable value of .50, suggesting that the model achieves a good balance between fit and parsimony. Over-

all, the reported indices support the adequacy of the structural model for testing the hypothesised relationships.

Table 9 presents the results of testing the fourth hypothesis, which examines the effect of overall attitudes towards using ChatGPT on academic motivation. In this model, attitude is treated as a higher-order construct encompassing affective, cognitive, and behavioural components. The findings indicate a strong and statistically significant positive relationship ($\beta = .681$, SE = .033, CR = 20.68, $p < .001$), providing support for H4. As shown in Figure 2, attitude is modelled as a higher-order construct comprising affective, cognitive, and behavioural components. This indicates a statistically significant association between overall attitudes towards ChatGPT and students' academic motivation.

DISCUSSION

This study examined the relationship between components of students' attitudes towards ChatGPT and their academic motivation. The findings revealed that the affective, cognitive, and behavioural components of attitudes towards ChatGPT, as well as overall attitudes towards the tool, were positively associated with academic motivation.

The findings revealed that the affective component was positively associated with academic motivation. Students who feel comfortable

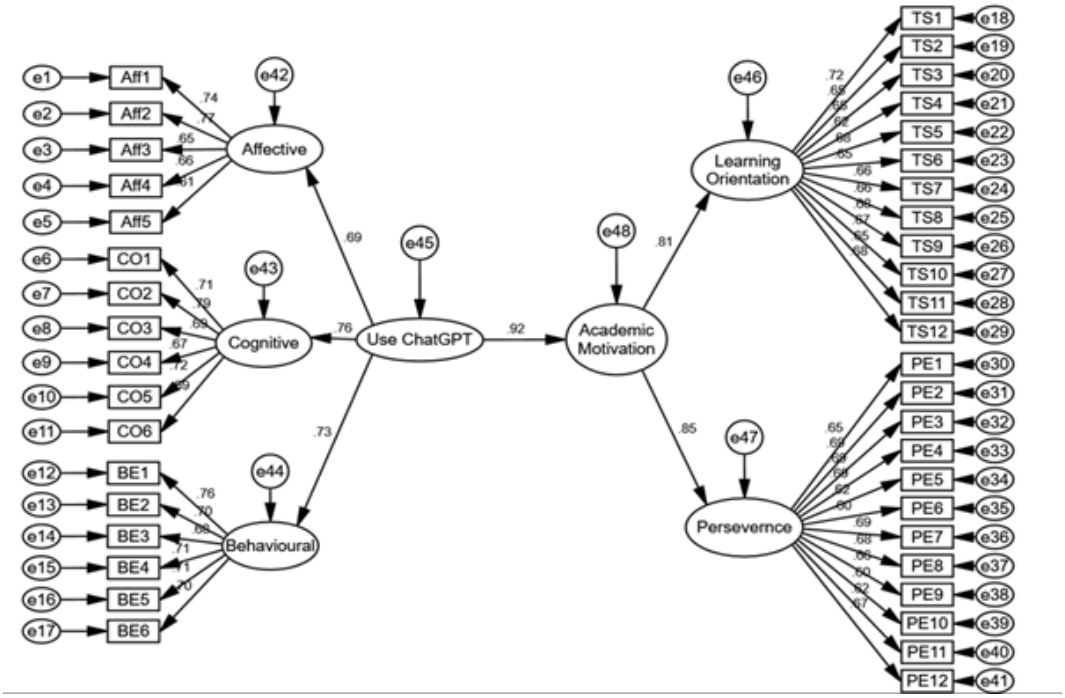


Fig.2. SEM model for H4: Overall attitudes toward ChatGPT and academic motivation

Table 9: Results of the fourth hypothesis test (H4)

Independent variable	*Path*	*Dependent variable*	*(Estimate) β*	*S.E*	*C.R.*	*Sig.*	*Result*
Attitude towards the use of ChatGPT	→	Academic motivation	.681	.033	20.68	***	Supported

*** Significant at a significance level less than (0.001)

using the tool and who perceive it as supportive may be more willing to engage with learning activities and persist when they encounter difficulties. This finding is consistent with Saif et al. (2024b), who reported that ChatGPT helped students cope with academic stress and anxiety by supporting them in managing academic demands, thereby encouraging more positive learning experiences. Similarly, recent studies have suggested that AI-powered learning tools can enhance students' confidence and engagement by providing immediate assistance and personalised feedback (Afzaal et al. 2025; Ravšelj et al. 2025). The relationship may be particularly relevant within the context of the present study, where first-year students represented the largest proportion of participants. Students in the early stages of university often face uncertainty regarding academic expectations, learning strategies, and assessment requirements. Consequently, a tool that provides immediate feedback and accessible explanations may offer reassurance and increase confidence, thereby strengthening motivation.

The cognitive component also emerged as a significant factor that affects academic motivation. Students who believed that ChatGPT was useful for understanding concepts, obtaining information, and supporting learning reported higher levels of motivation. This finding is consistent with previous research identifying perceived usefulness as one of the strongest predictors of students' acceptance and use of ChatGPT (Le et al. 2024). A similar pattern has been reported in the Saudi higher education context, where performance expectancy, defined as students' beliefs that ChatGPT enhances their learning performance, emerged as one of the strongest predictors of students' intention to use the tool (Sobaih et al. 2024). Similar findings have been reported by Sallam et al. (2024), who found that perceived usefulness and ease of use were among the strongest factors shaping students' positive attitudes towards ChatGPT in higher education. The present findings add a motivational dimension to this literature, that is, perceiving ChatGPT as useful may matter not only for whether students choose to use it, but also for how they approach their academic work. When students perceive a learning tool as helping them achieve academic goals more effectively, they may become more willing to invest effort and persist when faced with challenging tasks.

An interesting finding was that the behavioural component exerted the strongest effect on academic motivation, exceeding the effects of both the affective and cognitive dimensions. This suggests that motivation may be shaped less by what students think or feel about ChatGPT and more by how they actually use it. Students who actively use ChatGPT in their study routines are likely to experience its benefits directly through personalised explanations, immediate responses, and support with academic tasks. These experiences may reinforce their sense of competence and encourage further engagement with learning. In other words, the motivational value of ChatGPT appears to be most evident when positive perceptions translate into actual learning behaviours. This interpretation is consistent with the findings of Hamid and Fadila (2024) and Ali et al. (2023), who emphasised the practical benefits of ChatGPT in supporting students' learning processes. Recent evidence also indicates that using ChatGPT actively for purposes such as brainstorming, clarifying concepts, and obtaining feedback is associated with greater engagement and self-directed learning than occasional use (Ammari et al. 2025). However, active use does not necessarily imply effective or educationally productive use. Recent studies have cautioned that excessive reliance on GenAI may encourage cognitive offloading, whereby learners delegate cognitive processes to external tools rather than engaging in them directly. Such reliance may reduce opportunities for productive struggle, a process considered essential for deep learning, potentially limiting critical thinking and independent problem solving (Gerlich 2025; Jose et al. 2025).

The strength of the behavioural component may also be related to the characteristics of the sample. Previous research suggests that younger learners are generally more willing to experiment with emerging technologies and integrate them into their everyday practices (Siregar et al. 2023). Given that first-year students represented the largest group in the present study, the observed relationship may reflect the experiences of a cohort that is particularly comfortable with digital technologies and more inclined to adopt AI-powered tools in their learning environment.

The findings further demonstrated that overall attitudes towards ChatGPT were strongly associated with academic motivation. This result

highlights the importance of considering attitudes as a multidimensional construct rather than examining each dimension separately. While affective, cognitive, and behavioural components each contributed independently to motivation, their combined influence was substantially stronger. This suggests that students' motivation is shaped by an interaction between what they feel about ChatGPT, what they believe it can contribute to their learning, and how they use it in practice.

The strong relationship observed for the higher-order attitude construct is consistent with evidence that students' engagement with GenAI is shaped by multiple factors, including trust, perceived usefulness, accessibility, and prior technological experience (Sousa and Cardoso 2025). Sallam et al. (2024) similarly reported that students' perceptions of ChatGPT are influenced by both perceived educational benefits and concerns regarding potential risks. This suggests that favourable attitudes do not necessarily reflect unconditional acceptance. This interpretation is further supported by Faisal (2024), who highlighted ChatGPT's potential to enhance learning experiences and support student engagement in Saudi higher education when appropriately integrated into teaching and learning practices.

The positive associations found in this study should not be interpreted as evidence that increasing students' use of ChatGPT will necessarily improve educational outcomes. The concerns discussed earlier regarding the potential risks of over-reliance on GenAI highlight the need to interpret these findings with caution. Consequently, the educational value of ChatGPT is unlikely to depend solely on students' access to the technology but also on how it is integrated into learning activities and assessment practices. The challenge facing higher education institutions is, therefore, not whether to use ChatGPT but how to incorporate it into learning environments in ways that support, rather than replace, students' cognitive engagement.

CONCLUSION

This study provides further evidence that students' attitudes towards ChatGPT are closely associated with their academic motivation. The positive relationships observed across the affective, cognitive, and behavioural dimensions indicate that students who consider ChatGPT as a useful and supportive learning resource tend to demonstrate greater enthusiasm, persistence, and engagement in their academic work. The findings also highlight that students' responses to ChatGPT are shaped not only by what they think about the technology, but also by how they feel about it and the ways in which they use it for learning. While the results point to the potential of ChatGPT as a tool to support academic motivation, they also underscore the importance of its integration into educational settings in ways that encourage active learning, independent thinking and meaningful engagement with academic tasks.

RECOMMENDATIONS

In light of these findings, higher education institutions should position ChatGPT as a resource that complements students' thinking rather than performs that thinking on their behalf. Educators are encouraged to incorporate GenAI into learning activities that promote inquiry, reflection, and critical thinking, while providing clear guidance on its appropriate use. Ongoing institutional support and professional development may also help students and faculty use AI technologies effectively for educational purposes.

Future research could use longitudinal and experimental designs to clarify the direction of the relationship between attitudes towards ChatGPT and academic motivation. Such research could determine whether favourable attitudes lead to stronger motivation, whether more motivated students develop favourable attitudes towards ChatGPT, or whether the relationship works in both directions. Further studies could also examine how different ways of using ChatGPT relate to motivation and learning outcomes across educational contexts.

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