



Investigating the factors affecting pre-service teachers’ plagiarism behavior using ChatGPT: Relevance of fraud triangle theory and the theory of planned behavior

Lamees Alaulamie

Faculty of Educational Technology, Imam Abdulrahman bin Faisal University, Dammam, Saudi Arabia.
Email: laalaulamie@iau.edu.sa

Abstract

This study investigates academic dishonesty associated with ChatGPT use, thereby aiming to help universities develop ethical guidelines and learning practices. Plagiarism via ChatGPT constitutes a serious academic issue for faculties, as they seek to eliminate its impact on learning. The literature reports that ensuring academic integrity is essential to helping students develop their knowledge and succeed academically. Therefore, this study explores the validity of fraud triangle theory and two variables from the theory of planned behavior to better understand plagiarism behavior and the intention to plagiarize using ChatGPT. A mixed-methods approach was consequently adopted in a sequential explanatory design. Thus, quantitative correlational research was conducted using ordinal logistic and multiple linear regression. Specifically, a self-reported survey was administered to collect quantitative data from 136 participants, while qualitative data were collected through interviews with students and instructors. The findings indicate that behavioral intention is a significant predictor of plagiarism behavior. Meanwhile, a set of variables comprising opportunity, incentives, rationalization, subjective norms, and moral obligation was found to predict both plagiarism behavior and the intention to engage in plagiarism. As a result, this study offers theoretical insights into plagiarism behavior within a learning context.

Keywords: Academic dishonesty, ChatGPT, Fraud triangle theory, Higher education, Plagiarism, Theory of planned behavior.

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Contents

1. Introduction	265
2. Literature Review	265
3. Methodology	267
4. Findings	270
5. Discussion and Conclusion.....	9
6. Limitations and Implications of the Research	273
References.....	273

Contribution of this paper to the literature

This study investigates the factors relating to fraud triangle theory by adding two factors from the modified version of the theory of planned behavior, these being social and moral in nature. It aims to gain a deeper understanding of plagiarism behavior and the intention to plagiarize in academic writing.

1. Introduction

Academic dishonesty continues to pose a widespread problem in higher education, despite extensive efforts to prevent it. This has serious implications, as students who engage in dishonest practices in their academic life are often observed to be more prone to unethical behavior in their future careers (Hsiao & Yang, 2011). In the higher education context, students' subject knowledge and skills are mainly assessed through exams and assignments. However, these assessment measures can be affected by academic dishonesty, leading to inaccurate scores that do not reflect students' actual performance (Puspitosari, 2022). Consequently, universities prohibit unauthorized materials during exams and use plagiarism-detection software such as iThenticate or Turnitin to discourage academic misconduct. Nevertheless, content generated by ChatGPT and similar applications is not always detectable using such software, creating new challenges for universities. Therefore, it is essential to investigate the factors that lead students to engage in unethical academic behavior and provide evidence to guide universities towards establishing an appropriate and fair system of assessment (Al Shbail, Alshurafat, Ananzeh, & Al-Msiedeen, 2022).

Several previous studies have examined the phenomenon of academic dishonesty, most commonly from the perspective of the fraud triangle theory and the theory of planned behavior. According to Walker and Holtfreter (2015) fraud triangle behavior should be applied to academic dishonesty as a means of understanding the factors that underlie cheating behavior and research misconduct, since the theory is mainly concerned with actual behavior. Conversely, Beck and Ajzen (1991) found "that the theory of planned behavior predicted intentions with a high degree of accuracy, and that it was moderately successful in the prediction of actual behavior" (p.285). The theory of planned behavior refers to an individual's intention to perform a certain behavior, which can eventually lead to its performance (Beck & Ajzen, 1991; Hsiao & Yang, 2011). Among students, it is essential to explore both plagiarism behavior and the intention to plagiarize (BI) in order to prevent cheating and design effective means of assessment.

Previously, no consistent results have been published for the effect of fraud triangle theory factors (FTT factors: pressure, rationalization, and opportunity) on cheating behavior, but some studies have revealed a significant effect on academic cheating (Al Shbail et al., 2022; Heriyati & Ekasari, 2020; Pratama, Sangka, & Nugroho, 2023; Sharma, Mehta, & Vyas, 2024). In contrast, Juliardi, Sudarto, and Taufiqi (2021) found that no FTT factors have any significant effect on academic cheating, whereas (Mustapha, Malkan, & Anthony, 2024) identified rationalization and opportunity as the sole predictors. Meanwhile, Puspitosari (2022) reported that cheating behavior was only impacted positively by pressure and opportunity. Due to the inconsistency of these results, there is a need to retest the validity of the three factors mentioned above as predictors of cheating, specifically in relation to plagiarism in the Saudi context.

Conversely, the theory of planned behavior includes perceived behavioral control, attitude, and subjective norms; Beck and Ajzen's (1991) modified version of the theory was adopted in this study, thereby adding moral obligation. The theory of planned behavior has been used in previous studies to predict social behaviors, and in some cases, to explain cheating behavior (AL-Dossary, 2017). However, in the current study, moral obligation and subjective norms were selected as the research focus because they point to the social and moral aspects of cheating, which the author investigates alongside the FTT factors. In contrast, attitude and perceived behavioral control are more concerned with personal characteristics, which fall outside the scope of this study.

Therefore, fraud triangle theory and two variables from Beck and Ajzen (1991) modified version of the theory of planned behavior are tested in this study as predictors of students' plagiarism behavior and intention to plagiarize, specifically in reference to ChatGPT use in Saudi higher education. This is intended to fill the identified research gap and help Saudi universities develop effective strategies to address the problem of academic plagiarism, as facilitated by new technologies such as ChatGPT. The overarching aim is to help preserve academic quality and, in the longer term, professional integrity in the workplace.

2. Literature Review

2.1. ChatGPT and Plagiarism

Artificial intelligence (AI) is a technology that has recently been used extensively across disciplines. According to Mijwil et al. (2023), AI was developed to support rather than replace humans in accomplishing tasks. The algorithms in AI have the power to analyze and interpret given data and detect any patterns that emerge, thereby producing new output that resembles human output (Mijwil et al., 2023). In general, AI can complete tasks such as helping humans make decisions, expediting processes, imitating human intelligence, predicting outcomes, and undertaking repetitive, mundane, or monotonous tasks (Mijwil et al., 2023). Artificial intelligence can also be used in the education sector, as in the case of anti-plagiarism software such as Turnitin, which detects plagiarism by comparing documents and evaluating the percentage of matching text (Alkhaqani, 2023).

One AI application that has recently come into use among students is ChatGPT, which was first made available to the public on 30 November 2022 (Cotton, Cotton, & Shipway, 2024). The Chat Generative Pre-trained Transformer, or ChatGPT (Mahama, Baidoo-Anu, Eshun, Ayimbire, & Eggley, 2023), is an AI model designed to produce information based on conversations initiated by a question or specific request from the user (Cotton et al., 2024). In particular, ChatGPT has a human-like ability to perform different educational tasks such as translation, assessment, content generation, communication, and conversation by responding to questions (Cotton et al., 2024). Furthermore, ChatGPT can be used to generate outstanding written text and to summarize lengthy documents (Mijwil et al., 2023). Some of the advantages of ChatGPT in higher education include its ability to increase student engagement and collaboration (Cotton et al., 2024). Furthermore, ChatGPT can offer a customized learning experience and feedback, while also promoting interaction (Alkhaqani, 2023).

Nevertheless, some concerns have arisen regarding ChatGPT's potentially negative impact on human language processing (Cotton et al., 2024). Moreover, according to Mijwil et al. (2023), there are concerns over the ability of users to evaluate data and verify its accuracy using technologies such as ChatGPT, which could have a negative effect on their future capacity to accomplish complex tasks. In addition, the issue of academic dishonesty and unethical usage in scientific writing and research has been highlighted, since results generated by ChatGPT can be fabricated (Mijwil et al., 2023), and academic writing may be plagiarized (Alkhaqani, 2023).

Plagiarism is defined as “the act of using someone else’s work as your own without proper acknowledgment” (Alkhaqani, 2023). This includes appropriating both the ideas and words of others (Jarrah, Wardat, & Fidalgo, 2023). Therefore, implementing ChatGPT while neglecting suitable citation is considered plagiarism, since ChatGPT generates content based on pre-existing original content and algorithms, thereby resulting in new content that is not connected to its original authors (Jarrah et al., 2023).

One of the challenges of ChatGPT is that it tracks the user's behavior and writing style over time, which enables it to customize its future written output, so that it is individualized and human-like; consequently, it becomes difficult to detect ChatGPT-generated text using plagiarism software (Mijwil et al., 2023). It has been found that the growth of technology usage in universities around the world is directly associated with an increase in research misconduct (Muhammad, Ghani, & Rossli, 2021). Furthermore, the increase in AI development makes it easy for university students to engage in plagiarism (Alkhaqani, 2023). Here, it should be borne in mind that AI technologies like ChatGPT now give students access to materials that they can easily present as their own work, simply by copying and pasting them into a new document (Muhammad et al., 2021). This behavior is considered fraudulent.

Fraud is a term that is not exclusive to the business environment but also includes the academic domain. In fact, academic fraud is a growing international problem that needs to be addressed (Muhammad et al., 2021). It refers to actions that can lead to a misleading evaluation of students’ academic performance (Bujaki, Lento, & Sayed, 2019). According to Walker and Holtfreter (2015), academic fraud falls into two main categories: academic dishonesty and research misconduct. Based on the literature, academic dishonesty refers to cheating in exams, while research misconduct refers to actions related to plagiarism, fabricating research outcomes, or the misuse of research funding (Muhammad et al., 2021).

In higher education, the main goal is to raise standards and challenge students in the assignment of appropriate tasks. However, ChatGPT undermines this goal due to the possibility of students using it to engage in academic dishonesty and plagiarism (Cotton et al., 2024; Mahama et al., 2023). Information generated by ChatGPT does not reflect students’ actual academic writing ability and has a negative impact on human creativity (Cotton et al., 2024). Thus, the current study focuses on students’ misuse of ChatGPT in plagiarism. The following subsection presents the two theories applied in this study to explain plagiarism behavior and its associated factors.

2.2. Fraud Triangle Theory (FTT)

Fraud triangle theory is a framework that was developed by US scholar Donald Cressey in 1953, based on three constructs: opportunity, motivation (pressure), and rationalization. It has since been used by sociologists and psychologists to explain crime (Schuchter & Levi, 2016). According to Schuchter and Levi (2016), when one or more of these elements are absent, fraud is not expected to occur. Based on the literature, this theory can be used across disciplines, including in the study of education. According to Muhammad et al. (2021), the fraud triangle theory can help explain cheating behavior in the academic context, together with the associated factors. Abdullahi and Mansor (2015) mentioned that this theory can be used to explain factors that impact an individual and that could lead to fraud or other unethical behaviors. Numerous studies have adopted this theory to explain cheating behavior. The three main elements of fraud triangle theory may be defined according to Abdullahi and Mansor (2015) as follows:

- Opportunity refers to a person’s belief that they have no active control over their surroundings, which can motivate them to commit fraud.
- Motivation refers to the reasons behind a person engaging in immoral activity.
- Rationalization refers to a person’s own justification for their unethical behavior, in an attempt to make it morally acceptable to themselves.

Two synonyms for the motivating factor represented in the literature are incentive and pressure. In particular, Becker, Connolly, Lentz, and Morrison (2006) adopted the term “incentive”, whereas Juliardi et al. (2021) used the term “pressure” to describe the motivational dimension in the fraud triangle theory. Becker et al. (2006) define incentives as the motives for cheating that “come from within the students or from another person” (p.40). Similarly, Juliardi et al. (2021) define pressure as motivation that results in committing fraud due to incentives or demands. The current study adapts the instrument used by Becker et al. (2006), wherein the term ‘incentive’ was included among the FTT factors. All FTT factors emphasize personal aspects of a student’s cheating behavior. The current study is primarily concerned with these personal factors, in addition to social and moral aspects, specifically moral obligation and subjective norms. Thus, in the next sub-section, these two factors will be examined through the lens of the theory of planned behavior.

2.3. Theory of Planned Behavior

The current study looks at a modified form of the theory of planned behavior, as designed by Beck and Ajzen (1991), who added moral obligation to the original theory. The modified form of the theory of planned behavior demonstrates that attitude, subjective norms, perceived behavioral control, and moral obligation can predict an individual’s intention to engage in a behavior; as a result, these factors can predict that behavior. Beck and Ajzen (1991) define intention as “one immediate antecedent of actual behavior” (p.286), in the belief that when someone has a strong intention to engage in a certain behavior, they may be more likely to engage in it in the future. In the current study, among the four factors, moral obligation and subjective norms were chosen for in-depth study alongside the other FTT factors. This is because these two factors tend to be more closely associated with the social and moral aspects of cheating, which the present author intended to investigate. Conversely, attitude and perceived behavior control were excluded from this study, since these factors are more concerned with personal characteristics.

The theory of planned behavior has been used to predict social behaviors, and various studies have applied the theory to explain cheating behavior by discovering new factors that may affect it (AL-Dossary, 2017). Moreover, Beck and Ajzen (1991) are of the view that moral obligation should be considered if there is a moral concern about the measured behavior. Harding, Mayhew, Finelli, and Carpenter (2007) add that cheating behavior is unethical. Thus, the moral component is considered to be a significant factor of cheating behavior.

Subjective norms may be defined as “the perceived social pressure to perform or not to perform the behavior” (Ajzen, 1991). However, moral obligation has been defined as the moral values that bind human beings and drive them to act in a certain way (Stern, 2011). This current study aimed to examine the validity of fraud triangle theory in predicting students’ plagiarizing behavior using ChatGPT, in addition to two variables from the theory of planned behavior, which is more concerned with social and moral aspects.

2.4. Empirical Studies

Academic dishonesty is a crucial academic issue that some students have experienced, and ensuring academic integrity in learning is essential in order to help students develop their skills and knowledge, thereby enabling them to succeed in their university studies (Alkhaqani, 2023). The empirical studies reviewed in the following section are based on the fraud triangle theory and the theory of planned behavior. Most of these studies investigated academic cheating, although relatively few addressed plagiarism.

The studies by Becker et al. (2006); Heriyati and Ekasari (2020); Pratama et al. (2023); Al Shbail et al. (2022) and Sharma et al. (2024) investigated the elements of the fraud triangle theory, although their primary research objectives differed. In contrast, the study by Harding et al. (2007) and AL-Dossary (2017) aimed to examine cheating behavior using the theory of planned behavior. However, the current study focuses on the elements of the fraud triangle theory and incorporates two additional constructs from the theory of planned behavior: moral obligation and social norms.

Furthermore, all of these studies employed a quantitative survey design, whereas the current study adopts a mixed-method approach, using surveys and interviews to obtain an in-depth understanding of the associations among variables under investigation. Regarding the study participants, Becker et al. (2006) and Sharma et al. (2024) focused on business students, Al Shbail et al. (2022) and Heriyati and Ekasari (2020) focused on accounting students, and Harding et al. (2007) focused on engineering and humanities students. However, Pratama et al. (2023) investigated pre-service teachers, which is consistent with the target population of the current study. Based on this, few studies have been conducted among students majoring in education; instead, most studies in this area have been focused on students with majors in accounting, business, engineering, or the humanities. Thus, there is a need to explore the relationships among the research variables in new contexts.

The studies also differed in their cultural context. Specifically, they were conducted in countries such as USA, Indonesia, Jordan, and India, whereas the study by AL-Dossary (2017) and the current study were both conducted in Saudi Arabia. Based on AL-Dossary (2017), extensive research has been conducted on cheating in exams in Western contexts. Furthermore, the majority of previous studies have focused on cheating, while relatively few studies have examined plagiarism. In addition, to the best of the researcher’s knowledge, limited studies have been conducted on plagiarism using ChatGPT in the Saudi context. Moreover, no study to date has included social or moral factors with elements of fraud triangle theory to predict students’ intention to cheat, cheating behavior, or more specifically, their intention to plagiarize. Consequently, this study addresses the factors relating to fraud triangle theory by adding two factors from the modified version of the theory of planned behavior, these being social and moral in nature. The aim was to gain a deeper understanding of academic cheating behavior and the intention to cheat, especially plagiarism in academic writing. The theoretical framework for this study is represented in Figure 1.

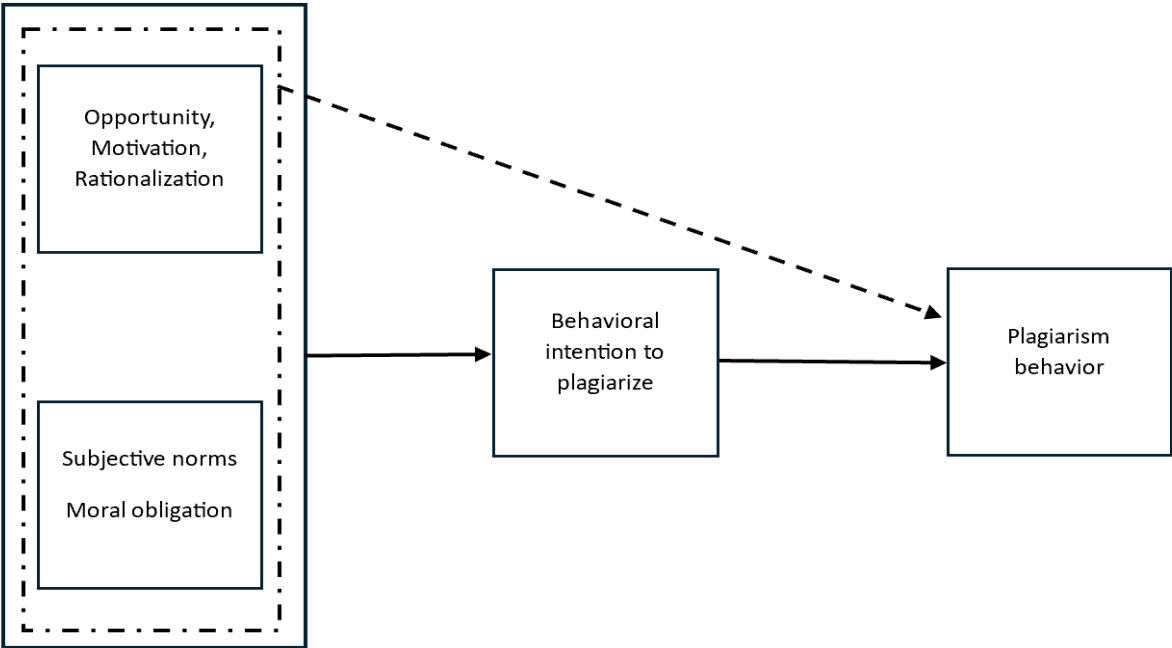


Figure 1. Theoretical framework based on fraud triangle theory and the theory of planned behavior.

3. Methodology

3.1. Research Design

This study was conducted using a mixed methods approach and a sequential explanatory design, based on Tashakkori and Teddie (2010). The researcher began by collecting and analyzing quantitative data, followed by

gathering and interpreting qualitative data to gain more detailed information and finalize an interpretation of the data as a whole. This approach was primarily adopted to acquire more data on students' plagiarizing behavior using ChatGPT. First, quantitative correlational research was performed to ascertain whether the research predictors foresaw the dependent variable. To determine whether the predictors explained variance in the dependent variable, a multiple linear regression approach was applied, together with ordinal logistic regression. These regression models were used since the study's primary aim is exploratory rather than confirmatory, in that it attempts to connect two theories and explain a predictive association rather than causal relationship.

To guide the research, the following research questions were formulated.

RQ1: Does the behavioral intention (BI) to plagiarize predict plagiarism behavior (PB)?

RQ2: Do opportunities, incentives, rationalization, subjective norms, and moral obligation predict plagiarism behavior (PB)?

RQ3: Do opportunities, incentives, rationalization, subjective norms, and moral obligation predict the BI to plagiarize?

Hence, a self-reported survey was distributed among pre-service kindergarten teachers to collect the quantitative data. The research sample comprised 136 participants. In addition, the qualitative data were collected in interviews with six pre-service teachers and four instructors to obtain in-depth information about the factors that would help predict the dependent variable. Each interview lasted for an average of seven minutes. The interviews with students were conducted in the College, whereas the interviews with faculty members were conducted over the phone.

The pre-service teachers' interview guide was set out as follows:

1. Has your instructor stated that using ChatGPT to complete assignments is considered as plagiarism or academic dishonesty?
2. In your opinion, what are the factors that impact students' plagiarism behavior?

Conversely, the faculty members' interview guide included three questions.

1. Do you announce in your lectures that using ChatGPT to complete assignments is considered as cheating or academic dishonesty?
2. Are there regulations in your college regarding the use of ChatGPT to write assignments?
3. In your opinion, what are the factors that affect students' plagiarism behavior?

3.2. The Participants

The survey participants consisted of 136 female pre-service teachers in a Kindergarten Program. These participants were drawn from different educational levels across a range of ages (see Table 1).

Table 1. Demographic information (n=136).

Measure	Items	Frequency	Percentage
Age of pre-service teacher (in years)	19 or under	48	35.3%
	20-22	62	45.6%
	23-25	23	16.9%
	Over 25	3	2.2%
Educational level	Freshman	25	18.4%
	Sophomore	77	56.6%
	Junior	18	13.2%
	Senior	16	11.8%

The interview participants comprised six pre-service teachers from the same population, all aged 20-22 years and majoring in Kindergarten Teaching. Meanwhile, the participating faculty members were four assistant professors, all teaching in the same College. All participants were drawn from the College of Education at Imam Abdulrahman bin Faisal University.

3.3. Data Collection and Analysis

3.3.1. The Research Instrument

The survey instrument used in this study was adapted from Al Shbail et al. (2022); Becker et al. (2006) and Harding et al. (2007) (see Appendix A), all the above studies being concerned with cheating in exams. Becker et al. (2006) applied the fraud triangle theory by examining its three elements, and Al Shbail et al. (2022) integrated social capital theory and fraud theory by introducing social factors to the latter, in order to study the factors that affect online cheating. However, Harding et al. (2007) applied the theory of planned behavior to understand exam-cheating behavior. In addition, the above authors measured the validity and reliability of their scales, finding them to be valid and reliable.

Given that Al Shbail et al. (2022); Becker et al. (2006) and Harding et al. (2007) were concerned with cheating in exams, the original statements were modified to adapt them to the topic of plagiarism in students' college assignments. The current instrument was specifically designed to measure the following constructs: opportunities (OP), incentives (IN), rationalization (RA), behavioral intention to plagiarize (BI), subjective norms (SN), moral obligation (MO), and plagiarizing behavior (PB). Statements that measured OP (items 1-3), IN (items 4-6), and RA (items 7-9) were taken from Becker et al. (2006), but one further item (item 8) was added to the rationalization scale. The statements that measured BI (items 10-14) and MO (items 20-22) were adopted from Harding et al. (2007), and to measure the SN construct (items 15-19), statements were taken from Al Shbail et al. (2022). However, the PB construct (item 23) was measured with a statement formulated by the present researcher.

After compiling the statements in the survey instrument, the entire survey was translated into Arabic. The raw Arabic version of the instrument contained 23 items. This instrument was then systematically translated into English in stages, beginning by translating the original survey and adapting the meaning of the statements, so that they were comprehensive in Arabic and suitable for the Saudi cultural context. This Arabic version of the instrument was then back-translated into English, and the original and back-translated versions were evaluated for their similarity. A comparison report showed that the two versions were similar in meaning.

The survey finally consisted of a consent form, demographic inquiry, and the construct statements. All the survey constructs, except for the PB construct, were measured using a five-point Likert scale. Each statement was to receive responses ranging from ‘Strongly agree’ (a value of ‘5’ on the scale) to ‘Strongly disagree’ (a value of ‘1’ on the scale), and vice versa for the reversed statements. This meant that strong disagreement with a reversed statement had the value of ‘1’. The PB construct was likewise measured using a five-point scale of responses: ‘Never’, ‘Seldom’, ‘Sometimes’, ‘Often’, and ‘Always’. These responses reflected the values 1-5, respectively. The consent form stated that participants could withdraw from the study at any time, and that their participation was purely voluntary. Ethical approval was obtained, and the study proposal and research instrument were reviewed, evaluated, and approved by the Institutional Review Board at the university where the study was conducted (see Institutional Review Board Statement).

Two types of evaluation were conducted in this study to verify the validity of the instrument: content validity and face validity. Validity was first assessed to determine whether the 23 preliminary statements were well constructed and related to their associated constructs. This was achieved by introducing the Arabic version of the survey to five experts in the field of education. The process began by asking each expert to give an opinion on the clarity, appropriateness, and relevance of each statement to its related construct and to ascertain whether the statements adequately represented their relevant construct. The experts mostly agreed (with agreement ranging from 80-100%) that all the items were clear, appropriate, and relevant to their related constructs. However, there was only 20% agreement on the relevance of items 9 and 19, due to their similarity to other items under the same construct. Moreover, there was an 80% agreement among experts that item 22 should be deleted, since it was a double-negative sentence and, in any case, it did not enhance the construct. Thus, these three items were deleted from the raw Arabic version of the survey, leaving 20 survey statements. To reduce measurement error, Podsakoff, MacKenzie, Lee, and Podsakoff (2003) highlight two procedural remedies for common method bias (CMB): assuring participants of their anonymity and improving item clarity by avoiding vague or unfamiliar terminology and double-barreled items. In this study, these procedures were followed to address CMB, as confirmed by the experts who reviewed the questionnaire.

Regarding the use of just one item scale to measure PB -despite this constraint- (Allen, Iliescu, & Greiff, 2022) report that having multiple items in a scale does not necessarily improve the construct scale; instead, a construct scale is enhanced by the number of possible responses. Moreover, the above authors add that for some participants, single-item scales are less repetitive and tedious than multiple-item scales, and this can affect their responses. In addition, Fuchs and Diamantopoulos (2009) highlight that single-item scales are acceptable under certain conditions, namely, where there is a concrete construct that is unidimensional, limited in scope, and well-defined. This applied to PB, for which a five-point scale was used, and the topic was well-defined as students’ plagiarism behavior while doing assignments. Furthermore, the construct was unidimensional and limited in scope. In sum, the experts agreed that a single-item scale was suitable for measuring PB. However, ordinal logistic regression revealed that the PB responses were sparse. According to Quan and Wang (2025), this occurs when a certain response is rarely selected by the research participants, and it can be handled by combining adjacent responses to reduce the number of response categories. In the current study, the five-point PB scale was reduced to a three-point scale, comprising: ‘Always-Often’ (3), ‘Sometimes’ (2), and ‘Rarely-Never’ (1).

This prior evaluation was followed by a pilot study involving 38 participants from the study population. The reliability of the constructs in the instruments was assessed by evaluating the internal consistency of the scale. First, the correlation coefficients between the item values and the total score for the related construct were calculated, revealing strong positive correlation coefficients ranging from .671 to .952, as shown in Table 2. This indicates a high degree of internal consistency.

Table 2. Correlation between each item and the total score of its sub-questionnaire.

OP		IN		RA		BI		SN		MO	
Item	R	Item	R	Item	R	Item	R	Item	R	Item	R
1	0.833*	4	0.950*	7	0.671*	10	0.839*	15	0.723*	20	0.933*
2	0.798*	5	0.952*	8	0.828*	11	0.690*	16	0.857*	21	0.935*
3	0.877*	6	0.926*			12	0.808*	17	0.814*		
						13	0.814*	18	0.762*		
						14	0.760*				

Note: * Correlation is significant at the 0.01 level (one-tailed).

Additionally, Cronbach’s alpha values were calculated to ensure the reliability of the scale’s constructs. As seen in Table 3, the Cronbach’s alpha values ranged from 0.784 to 0.937, indicating homogeneity across each group of items that measured the same construct. DeVellis (2017) suggests that a research scale with a Cronbach’s alpha value of between 0.70 and 0.80 has respectable internal consistency, and very good internal consistency if the Cronbach’s alpha value is between 0.80 and 0.90. Thus, the research constructs showed high internal consistency. For RA and MO, inter-item correlation was evaluated and the Spearman-Brown formula was applied to ensure the reliability of the constructs, since both contained just two items each. According to Eisinga, Grotenhuis, and Pelzer (2013), Spearman-Brown is a suitable reliability estimate for two-item scales. The inter-item correlation values for RA and MO were 0.650 and 0.810, and Spearman-Brown coefficient values for RA and MO were 0.787 and 0.893, respectively. DeVellis (2017) reported that values between 0.70 and 0.80 are considered respectable.

Table 3. Reliability of the instrument.

Construct	Item	No. of Items	Cronbach’s Alpha	Internal Consistency
OP	1-2-3	3	0.784	Respectable
IN	4-5-6	3	0.937	Very good
BI	10-11-12-13-14	5	0.835	Very good
SN	15-16-17-18	4	0.802	Very good

3.3.2. Data Analysis

The quantitative data were analyzed using ordinal logistic regression and multiple linear regression to answer the research questions. The data analysis was undertaken using SPSS version 29.0 software. However, the qualitative data were analyzed using coding and thematic analysis. This procedure began with analyzing and coding the responses to capture the main themes, after which an independent researcher coded the responses. This was followed by measuring the degree of agreement between the two raters by calculating the Cohen’s Kappa statistic to assess inter-rater reliability, thereby producing a Kappa value of 0.80. Landis and Koch (1977) estimate that a Kappa value between 0.61 and 0.80 is appropriate. The qualitative data sample size was guided by a data saturation approach, and the interviews were conducted until no new themes emerged. Thematic redundancy was detected after reviewing the ten interview transcripts. Therefore, it was unlikely that new themes would have emerged from further interviews. This is supported by Hennink, Kaiser, and Marconi (2017), who found that code saturation could be reached by nine interviews.

3.3.3. Procedure

This study began with the collection of quantitative data, using an anonymous self-reported survey administered via Microsoft Forms. A voluntary convenience sampling approach was adopted to collect the data by distributing the questionnaire to all students registered at the College of Education in Imam Abdulrahman bin Faisal University, via a WhatsApp group dedicated to academic advice. The questionnaire was distributed during the second semester in the academic year 2024. The target sample comprised undergraduate students at the college, all of whom were female and enrolled in the kindergarten program. A total of 291 active registered pre-service teachers were invited to participate in the questionnaire, and only 136 participants completed it, resulting in a response rate of 46.7%. The anticipated aim of the study was stated clearly to the participants in the survey's introductory section, whereby the participants were notified that their involvement was completely voluntary, and withdrawal from the study was possible at any time.

The second stage began with the collection of qualitative data, conducting semi-structured interviews with six pre-service teachers and four faculty members. These interviewees were informed that any information they provided would be kept confidential and anonymous, and they could end their participation whenever they wished. The responses were subsequently analyzed and coded, and the main themes were extracted separately by the author and an independent researcher.

4. Findings

The mean and standard deviation of the constructs were calculated to gain an understanding of the collected data. As seen in Table 4, the mean values ranged from 1.79 to 3.15, based on the following classification: low (1-2.33), moderate (2.34-3.66), and high (3.67-5.0). The standard deviation ranged from 0.59 to 1.12.

Table 4. Mean and standard deviation of the constructs.

Construct	Mean	Standard Deviation	Level
PB	1.79	0.954	Low
OP	2.7770	0.58662	Moderate
IN	2.6593	1.12031	Moderate
RA	3.1581	1.07445	Moderate
BI	2.2647	0.78914	Low
SN	2.3419	0.78399	Moderate
MO	2.4265	1.10977	Moderate

First, ordinal logistic regression was performed to determine whether BI (the predictor) predicts PB. This relates to RQ1, for which ordinal logistic regression was used, since the dependent variable (PB) is an ordinal variable. Preliminary data screening showed that the scores for PB were normally distributed. A linear relationship was found between the two variables, with no extreme bivariate outliers. However, five data points were missing. Little’s ‘Missing at Random’ (MCAR) test was therefore conducted, producing non-significant results, which reflected that these data were missing completely at random ($\chi^2=135.17$, $df=136$, $p=0.504$). Thus, the missing data were handled using listwise deletion. Conversely, the correlation between PB and BI was statistically significant, $r(134) = 0.47$, $p<0.001$, indicating a positive relationship. Moreover, the proportional odds assumption was evaluated using a parallel lines test ($\chi^2(1)= 2.17$, $p>0.05$), reflecting that this assumption was met and the regression is appropriate. Meanwhile, the results of the deviance test were insignificant, indicating that the model was a good fit. In contrast, the results of the ordinal logistic regression model were statistically significant ($\chi^2(1)= 11.47$, $p< 0.001$), revealing BI as a significant predictor of PB, whereas BI explained 10% of the variance in PB, given that Nagelkerke $R^2 = 0.103$.

To answer RQ2, ordinal logistic regression was also conducted to ascertain whether the predictors, OP, IN, RA, SN, and MO, predict PB. This type of regression was performed to examine the most influential variables among the factors indicated as predicting PB, given that PB is an ordinal variable. The regression assumptions were assessed, finding that all were met. The assumption of collinearity was evaluated with tolerance values between .486 and .980. Meanwhile, the variance inflation factor (VIF) ranged between 1.032 and 2.279, presenting no multicollinearity concerns among the predictors in either model. Based on Warner (2008), predictors with tolerance values that are not close to zero do not flag any concerns about multicollinearity. The proportional odds assumption was evaluated using a parallel lines test ($\chi^2(5)= 13.949$, $p>0.05$), reflecting that this assumption was met and the regression was appropriate. Moreover, the results of the deviance test were insignificant, identifying the model as a good fit. Finally, Table 5 presents the results of the ordinal logistic regression model, which was statistically significant ($\chi^2(5)= 50.212$, $p< 0.001$), meaning that PB was significantly predictable from the set of variables: OP, IN, RA, SN, and MO. Overall, the model explained 42% of the variance in PB (Nagelkerke $R^2 = 0.419$).

Table 5. Model summary of ordinal logistic regression for predicting PB.

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	158.320			
Final	108.108	50.212	5	<0.001

Link function: Logit.

Table 6 shows the contribution of each predictor, reflecting that only IN, SN, and RA have a unique effect on PB. The strongest and most positive effect on PB was from IN ($B=1.831, p<0.001$), whereas SN ($B=-0.989, p<0.01$) and RA ($B=-0.816, p<0.05$) had a negative effect on PB (see Table 6), indicating that the higher the level of SN and RA, the lower the probability of high PB.

Table 6. Table of parameter estimates.

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[PB = 1]	-1.155	1.953	0.350	1	0.554	-4.983	2.673
	[PB = 2]	0.598	1.945	0.094	1	0.759	-3.214	4.410
Location	OP	-0.412	0.398	1.073	1	0.300	-1.192	0.368
	IN	1.831	0.380	23.254	1	<0.001	1.087	2.575
	RA	-0.816	0.389	4.406	1	0.036	-1.578	-0.054
	SN	-0.989	0.362	7.485	1	0.006	-1.698	-0.281
	MO	-0.254	0.272	0.872	1	0.350	-0.788	0.280

Link function: Logit.

Regarding the qualitative data, three out of the six students who were interviewed mentioned that they knew of peers who had used ChatGPT to complete their assignments and reports. This was confirmed by two of the four faculty members, who voiced their suspicions that students had used ChatGPT to complete assignments, although the program for detecting plagiarism had failed to recognize it. Thus, in the qualitative results, half the interviewees reported instances of ChatGPT being misused by students to engage in plagiarism. This differs from the quantitative result, which showed a low self-report of PB among the pre-service teachers ($M=1.79, SD=0.954$).

In the quantitative results, IN, SN, and RA were indicated as significant predictors of PB, while IN was the strongest predictor. When all the interviewees (Students and faculty) were asked about the factors that could affect students' use of ChatGPT in plagiarism behavior, most of the responses relating to the main factor were categorized under the incentive construct (IN), which supports the previous quantitative result. In detail, all the students interviewed agreed that college students face pressure to complete assignments within a short turnaround, at the same time as having a high volume of other assignments to complete. This is what allegedly drove them to use ChatGPT to cut corners. Two students added that they sometimes found their assignments very challenging, while their instructors always expected them to accomplish work of a high quality. Consequently, ChatGPT enabled the students to meet this ideal standard. One student justified herself accordingly.

(I)nstructors sometimes give us complicated grading rubrics that we should meet in order to get full grades, and it is hard to figure it out by ourselves, ... ChatGPT helps to meet their expectations with less time and effort.

Similarly, one faculty member stated.

(S)ome students tend to choose the easy way to accomplish homework, and as instructors, we help them to do so by giving them rubrics. However, students think that the rubric makes things complicated. Thus, they seek help using applications such as ChatGPT, which is easy to use.

With regard to regulating ChatGPT usage, all the instructors claimed that, at the time of the interviews, there was no such formal regulation at their University. However, they stated that they informed their students in every course that the misuse of ChatGPT to complete assignments was unacceptable and constituted academic dishonesty. Two of the instructors added that in cases of suspected plagiarism, they usually resorted to Turnitin (A plagiarism detection program), which was available to all instructors in the university. Every student interviewed corroborated this, stating that they had been warned about inappropriate ChatGPT usage by some instructors. It should be highlighted here that one faculty member mentioned measures at the university to control the use of ChatGPT, with the university in the final stages of instituting a new regulation to govern the matter. To answer RQ3, multiple regression was subsequently conducted to ascertain whether the predictors, OP, IN, RA, SN, and MO, could predict BI. The regression assumptions were assessed, finding that all were met. The overall regression model, including all five variables, revealed that $R = 0.673$ and $R^2 = 0.453$, reflecting that these predictors explained 45% of the variance in BI. Moreover, the regression model was statistically significant: $F(5, 130) = 21.54, p<0.001$. Hence, BI was positively correlated with all the predictors except SN and MO. The contributions of these predictors were consequently examined, as seen in Table 7, finding that three of the five variables were significant predictors of BI. Specifically, IN was a positive significant predictor, while SN and MO were negative significant predictors of BI. Based on the value of standardized coefficients, the predictors were ranked from strongest to weakest, as follows:

- IN ($t(130) = 5.426, p<0.001$).
- SN ($t(130) = -3.837, p<0.001$).
- MO ($t(130) = -4.014, p<0.001$).

Table 7. Table of coefficients for predicting BI.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.863	0.398		7.188	<0.001
	OP	0.075	0.088	0.056	0.853	0.395
	IN	0.338	0.062	0.480	5.426	<0.001
	RA	-0.067	0.064	-0.091	-1.044	0.298
	SN	-0.241	0.063	-0.263	-3.837	<0.001
	MO	-0.188	0.047	-0.275	-4.014	<0.001

5. Discussion and Conclusion

Plagiarism is an example of academic dishonesty that has recently been on the increase, due to the emergence of new technology. Potentially, plagiarism has a negative impact on students' future writing skills, and misuse of this technology could involve unethical academic conduct. The present study emphasizes the factors that predict students' plagiarism behavior, applying fraud triangle theory and two additional factors (SN and MO), relating to the theory of planned behavior. The following subsection outlines and discusses the main research results.

5.1. Prediction of Plagiarism Behavior

The first result showed a positive correlation between PB and BI, with BI found to be a significant predictor of PB, which explains 10% of its variance. This result is in line with the theory of planned behavior and those of other studies, namely, AL-Dossary (2017); Al Shbail et al. (2022); Beck and Ajzen (1991) and Harding et al. (2007), which suggests that the BI to cheat leads to cheating behavior and is a significant predictor of cheating. Moreover, Harding et al. (2007) revealed that these two variables are strongly correlated. Thus, it was expected in the current study that students who reported a strong intention to plagiarize would be more likely to engage in plagiarism in the future, and as the theory of planned behavior suggests, the intention to perform a certain behavior leads to actual performance of that behavior.

The second result showed that the set of variables (OP, IN, SN, and MO) was significantly correlated with PB and significantly predicted it, explaining 42% of its variance, which is consistent with Becker et al. (2006); Heriyati and Ekasari (2020); Pratama et al. (2023) and Sharma et al. (2024). It demonstrates that the elements of the fraud triangle theory (rationalization, pressure, opportunity) have a significant effect on academic dishonesty, thereby supporting fraud triangle theory in the Saudi context. Additionally, Harding et al. (2007) suggest that MO and SN are positively correlated with cheating behavior.

However, only IN, SN, and RA were significant predictors of PB, with IN being the strongest significant predictor. This may be explained by the qualitative results, since all the interviewees' responses were formulated and categorized under the IN construct, which was the only factor reported by the interviewees to affect PB using ChatGPT. According to Pratama et al. (2023), when students are under intense pressure, they tend to use AI technology to gain good grades in assignments or exams. Based on the interviewees' responses in the current study, students tend to commit plagiarism as a result of time constraints and high pressure, heavy assignment workload, difficult assignments and complicated rubrics, and intrinsic or extrinsic pressure to produce high-quality assignments and gain excellent grades. Consideration of these pressures would therefore help universities to develop effective measures to prevent plagiarism behavior (Pratama et al., 2023).

Furthermore, adding SN to the prediction model showed that SN can also predict PB, meaning that elements of the theory of planned behavior could be integrated with fraud triangle theory to predict PB. It would appear that PB may be predicted if the students perceive the importance of social influence. This prediction relationship between SN and PB was negative, which was anticipated since the students perceived subjective norms as an important social value. Social pressure was especially indicated, and it was expected that students with high subjective norms would not engage in plagiarism behavior. In general, Saudi families attempt to raise their children with high moral values and an emphasis on honesty. In this light, the students were aware that their families would not approve of cheating behavior and this may have deterred them from engaging in it, or at least from acknowledging it. This is in line with Harding et al. (2007), which suggests that students are more likely to cheat when the people around them do not discourage it, whereupon they will not feel any moral responsibility to avoid it.

Additionally, the results revealed RA as a significant negative predictor of PB, which could be explained as some students rationalizing plagiarism behavior, even though they were unwilling to engage in it themselves. The reason for this was that some of the sampled students did not consider plagiarism to be cheating. Nevertheless, based on the interviews, it appeared that most of the instructors had made their students aware of the consequences of plagiarism and misuse of ChatGPT to complete their assignments. Conversely, OP was not found to be a significant predictor of PB, which could be explained as students witnessing their peers engage in plagiarism but not taking the risk of engaging in it themselves for fear of it being detected by their instructors. This is supported by Pratama et al. (2023), who highlight that even if the opportunity exists, not all students use AI technology to cheat in their assignments.

5.2. Prediction of Behavioral Intention

The third result showed that all the variables (OP, IN, RA, SN, and MO) predicted BI and explained 45% of its variance. However, IN, SN, and MO were found to be the only significant predictors of BI in this study, with IN being a positive predictor, while SN and MO were negative predictors. The negative relationship between SN and MO and the outcome variable BI could be explained by students who perceive social pressures and moral obligation as normative, refraining from actual plagiarism. No previous study has gathered OP, IN, RA, SN, and MO as predictors of BI, although various studies have indicated the existence of a relationship between these factors and BI. For example, Hsiao and Yang (2011) confirmed that SN is correlated with the intention to cheat. Moreover, Al Shbail et al. (2022) indicated that OP, IN, RA, and SN affect BI. Finally, AL-Dossary (2017) suggests that SN and MO predict the intention to cheat, and the prediction relationship of SN and MO with BI is supported by the modified version of the theory of planned behavior presented by Beck and Ajzen (1991).

In conclusion, this study examined the elements of fraud triangle theory and two variables from the modified version of the theory of planned behavior – namely, SN and MO – to explore the factors that predict students' use of ChatGPT in plagiarism behavior. The results revealed BI to be a significant predictor of PB. Furthermore, OP, IN, RA, SN, and MO explained 42% of the variance in PB. However, the only significant predictors of PB were IN, SN, and RA, with IN being the strongest significant predictor. Finally, OP, IN, RA, SN, and MO were found to predict BI, explaining 45% of its variance, while IN, SN, and MO were indicated as significant predictors of BI, and IN was the strongest significant predictor.

6. Limitations and Implications of the Research

Despite the valuable findings of this study, a number of limitations need to be addressed, one being its small sample size, given the sensitivity of the research topic. To clarify, although the survey was distributed to a large number of students, the response rate was low since some students may have been worried that their responses would be exposed if they participated. This is despite the privacy of their information being assured in the consent form. Thus, a larger sample size should be used to validate these results in future studies. Furthermore, the participants were selected entirely from a specific program in the College of Education at a Saudi university. Therefore, it is recommended that the questionnaire be distributed to students with different majors. Furthermore, this study emphasizes just five factors: IN, RA, OP, MO, and SN. Consequently, future studies are recommended to explore other factors that could affect students' behavioral intention to plagiarize and actual plagiarism behavior. Finally, given that the participants were all pre-service teachers in a Kindergarten Program at a College of Education that is only open to female students in Saudi Arabia, it is suggested that future studies explore the gender factor in different subject areas.

Nevertheless, regardless of the above limitations, the current study provides potential implications and several recommendations for policymakers, decision-makers, instructors, and future studies, as follows:

1. Policymakers and decision-makers in universities should consider updating their plagiarism policies and regulations to keep pace with the new AI technologies available to all students. These policies need to differentiate between ethical and unethical practices, such as plagiarism, and be clearly announced to students to help prevent plagiarism.
2. University instructors should be given suitable access to anti-plagiarism programs through the appropriate platform to help them evaluate students' assignments effectively, revealing possible plagiarism.
3. Based on the study findings, IN was identified as a significant predictor of BI and PB. Thus, educators need to understand and prevent the potential motives behind cheating or plagiarism behavior. For example, educators must understand that they can encourage students to avoid plagiarism by giving them enough time to complete their assignments. They should also clarify the rubrics for assignments, assuring their students that the reason for them undertaking assignments is to measure their skills, not to reduce their grades.
4. Future studies could give attention to the actual use of AI technologies and their effect on the quality of students' work. This would help enrich knowledge of AI usage in education and maximize its benefit. Moreover, it is beneficial to focus on the effectiveness and credibility of using AI in education, and how to ensure academic integrity while using this technology. Furthermore, research could focus on existing policies and their effectiveness in preventing plagiarism.

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Appendix A. Survey instrument.

Instrument	Source
1. Many students in my classes have copied answers to their assignments from ChatGPT.	Adapted from Becker et al. (2006)
2. Plagiarism in assignments using ChatGPT occurs frequently on our program.	
3. The faculty do not take substantial action to deter academic dishonesty.	
4. In some classes, I can't get the grade in assignments that I want without using ChatGPT.	
5. I don't have enough time to complete certain assignments without using ChatGPT.	
6. I have a difficult time keeping up with my classes.	
7. If a professor does not explain what he/she considers plagiarism, the professor can't say I plagiarize my assignments when using ChatGPT.	
8. There are no regulations in the College that state that using ChatGPT is plagiarism or cheating.	The Author
9. The faculty usually detects academic dishonesty related to using ChatGPT.	Adapted from Becker et al. (2006)
10. I will try to plagiarize my assignments during the current academic term using ChatGPT.	Adapted from Harding et al. (2007)
11. I intend to plagiarize my assignments during the current academic term using ChatGPT.	
12. I do not plan to plagiarize my assignments during the current academic term using ChatGPT.	
13. I will not plagiarize my assignments during the current academic term using ChatGPT.	
14. If I had the opportunity, I would plagiarize my assignments during the current academic term using ChatGPT.	
15. People who are important to me think that I should plagiarize my assignments using ChatGPT.	Adapted from Al Shbail et al. (2022)
16. People who influence me think I should participate in plagiarism.	
17. People around me have encouraged me to plagiarize on my assignments using ChatGPT.	
18. Most of my classmates plagiarize their assignments using ChatGPT.	
19. People whose opinions I value prefer to plagiarize their assignments using ChatGPT.	
20. Cheating and plagiarism in assignments using ChatGPT is against my principles.	Adapted from Harding et al. (2007)
21. I would feel guilty if I plagiarized my assignments using ChatGPT.	
22. It would not be morally wrong for me to plagiarize my assignments using ChatGPT.	
23. Have you used ChatGPT to complete any assignments?	The Author