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RESEARCH ARTICLE

An analysis of factors contributing to the severity of academic cheating behavior among university students—A case of Hefei city

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ABSTRACT

The aim of this study was to investigate the causes of academic cheating among university students at a university in Hefei, Anhui Province. 642 general students from Accounting, Finance and Architecture were randomly selected from a university, and data were collected by distributing questionnaires. To collect the data, a questionnaire was used that included the socio-demographic characteristics of the participants and relevant cheating factors. The results of the study highlighted factors related to the students themselves, factors related to teachers and factors related to peers. The questionnaire used to collect data included both socio-demographic characteristics of the students and factors influencing cheating, and the study found that despite the majority of respondents perceiving the seriousness of cheating, they continued to actively engage in cheating behavior. This paper analyzes the factors affecting the severity of cheating among college students by questionnaire survey and data collection, and uses SPSS and AMOSS technology.

Keywords: academic cheating, cause analysis, countermeasure research, Hefei, Anhui, higher education

1. Introduction

Academic cheating remains prevalent in higher education institutions, with common practices including passing exams by copying papers, writing answers on their palms, and directly plagiarizing others 'responses. The more complex issue lies in the use of electronic devices—— Which make such cheating harder to detect, while the widespread internet has exacerbated the problem as students not only easily recognize various cheating methods but also master specific operational techniques. Students' cheating undermines academic integrity. Kaisoglu and Temer (2017) pointed out that academic fraud prevents students from experiencing the true essence of success and enjoying the fruits of their efforts. Therefore, it is crucial to explore and implement measures to curb academic cheating. Academic dishonesty has become a major issue in global education systems, particularly intensifying among college students, severely hindering human societal development. The key to education lies in helping students understand academic concepts to enhance their awareness and reduce participation in cheating behaviors (Aiman et al., 2022)[1]. Academic cheating represents a widespread and troubling phenomenon in education, encompassing acts like cheating, plagiarism, data fabrication, or improper citations. Bertrand Garant et al. (2008)[2] listed 21 types of cheating

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behaviors, including exam cheating, proxy testing, unauthorized material usage, identity fraud, and plagiarism of others' assignments; while Chirikov (2020)[3] added electronic cheating—— This pervasive behavior has become an urgent challenge for higher education institutions. Most university students engage in dishonest practices like cheating and plagiarism, viewing them as competitive tactics to outdo others. Moral education should be a comprehensive strategy that goes beyond skill development and subject knowledge transmission. It must integrate into campus culture to inspire every member to establish ethical expectations, develop sound thinking patterns, and practice proper conduct. As Valentine (2007)[4] noted, academic cheating constitutes "a behavioral pattern involving participants' values, attitudes, emotions, and social relationships with others and their institutions." With the widespread use of word processing software and internet access, cheating has entered the digital age. Given this reality, we must confront these phenomena head-on, identify their root causes, and implement effective solutions.

2. Literature review

Lawrence Kohlberg (1958)[5] proposed a six-stage theory of moral reasoning, divided into three levels of moral development. In Level 1 (pre-traditional moral reasoning), ethical judgements are based on personal needs and cultural rules. In the second level (traditional moral reasoning), ethical judgements are based on what is expected of a person's family, society, or country, without regard to perceived consequences. In the final level (post-traditional moral reasoning), one's moral values or principles are defined with validity beyond the claims of any individual or group.He emphasized that moral development progresses from childhood through adolescence, with ethical standards continuously rising. Childhood primarily corresponds to the pre-conventional stage, while adolescence (around age 16) becomes the critical phase for establishing conventional moral principles. Moral capacities typically stabilize during adulthood (around age 20). This theory highlights that higher education constitutes a pivotal period in students' ethical growth, making moral education curricula and ideological-political education particularly vital during this developmental stage.

Academic dishonesty refers to the unethical behavior of students towards academic assessment and practice, which represents academic behavior that does not comply with the prescribed assessment requirements, and occurs when a student's behavior is aimed at obtaining undue benefits associated with the assessment (Gouveia, V. V., 2021)[6].

Academic fraud is a global phenomenon. Studies on the pathways of academic dishonesty have shown that this trend is prevalent in higher education globally. According to Eshet, Y. (2021)[7], the high or low rate at which university students engage in various dishonest behaviors has been a central concern of academics and university administrations over the years. Cheating is defined as the violation of established rules governing the administration of an examination or the completion of an assignment, and is any act that gives one student an unfair advantage over other students in an examination or assignment, or any act that reduces the accuracy of the expected inferences arising from a student's performance in an examination or assignment. According to Finn, K. V.et al. (2024)[8], the most common violation of academic integrity is plagiarism, which is caused by poor paraphrasing practices and incorrect citation formats. On the other hand is deliberate deception, ranging from buying, selling or trading papers, to arranging for someone to sit an exam.

As one of the main pillars of sustainable education, academic integrity plays a key role in contributing to social progress by ensuring the transfer of ethical values, credible knowledge and outstanding skills. In this sense, academic dishonesty becomes one of the main factors of degradation in higher education and there is an urgent need for targeted educational actions to restore reliability, honesty and justice in the educational process. The present study, which aims to address the problem of academic dishonesty and

strengthen the culture of integrity, is based on the assumption that students cheat because of lack of knowledge about the rules, regulations and breaches of integrity in academic honesty.

Since 2009, China's Ministry of Education has issued six policies on academic dishonesty, and there is evidence that a significant number of people were punished for academic dishonesty between 1999 and 2010. In addition to this, higher education institutions in China are taking steps to address the challenges associated with academic integrity. Among the various factors that motivate students to cheat, the pressures faced by modern students are of concern. Due to the competitiveness of the job market, students are under immense pressure. At the same time, the massification and commercialisation of higher education has influenced the pressure to perform. Universities are also under pressure to excel in academic research due to the large number of universities competing with each other. In such a context, quantity tends to overshadow quality.

There are many reasons why students cheat and International Centre for Academic Integrity. (2020)[9] identified several common reasons why students cheat in different educational settings. These include: fear of failure, desire for better grades, pressure from parents to do well, unclear instructional goals, everyone else is doing it, little chance of getting caught and no punishment if caught. Whether it is motivated by a desire to succeed, peer standards of behavior, or their own ignorance, there is compelling evidence that most students cheat during their college experience, but they may not understand that what they are doing is actually unethical . Common rationalisations for cheating on a test include: that I didn't know it was cheating; that it didn't hurt anyone; that I know other people who do the same thing; that I worked hard in the class and deserved a good grade; and that I had a job, family, and other responsibilities and didn't have the time to adequately prepare for the class and take the test. Peers with peer pressure, instructors with tolerant eyes when observing cheating, parents who value grades, and cooperative friends all increase the incidence of cheating. Higher perceptions of expected benefits increased the likelihood that students would cheat, while higher levels of expected costs were found to inhibit cheating intentions. Curbing cheating is an internal and informal process among students that can only be altered by significant changes in the campus environment regarding academic dishonesty.

Providing clear policies in the curriculum and communicating to students the importance of honest behavior and the consequences of dishonesty, providing timely cognitive cues, and by providing documentation that students have been told and cannot plead ignorance, students will not be able to ignore.

Institutions that promote and enforce an honor code have lower rates of academic fraud, suggesting that strategies at the institutional level are effective. Incorporating ethics education into the core curriculum so that all learners understand the requirements, the potential causes and complexities of academic dishonesty, and find solutions is critical to creating an effective system of academic culture to try to combat this phenomenon. A review of research by McCabe, D. L. (2005)[10] found that the strategy was effective in supporting students who had already gained basic information about academic integrity, academic dishonesty, and its consequences. This ethical strategy is the best social norms approach for behavioral interventions that can be used to justify perceptions of inaccuracy in one's own behavior and to develop an academic culture that supports a code of honor and discourages academic fraud .Field observations by McCabe, D. L. et al (2012)[11]found that this strategy was able to increase students' perceptions of the academic activities in which importance of and sensitivity to ethical and moral behavior.

Plagiarism is defined as the unauthorised use of another author's language and ideas and representing them as one's own. The problem of academic dishonesty is a pervasive one, dating back thousands of years and caused by the majority of students. In contrast, attempts to promote academic integrity are relatively new and rare, dating back only a few hundred years and implemented by a small group of schools. Over the past

decade, however, universities have made increasing efforts to promote academic integrity among students, particularly through the use of online courses. This type of instruction is effective in increasing students' knowledge of academic integrity and reducing their involvement in academic dishonesty, and these efforts include face-to-face seminars and online courses as well as blended learning methods. The most common approach is to require incoming students to complete a short, web-based course on academic integrity.

3. Research methods

The aim of this study was to design and evaluate an online module to be taken during the university years aimed at improving students' understanding of the concepts of academic integrity and practice. The module consisted of a range of interactive resources (gamified quizzes and electronic booklets) and was made available to a large number of students. The study used a mixed-methods approach with three sequential stages, firstly collecting student perceptions of existing academic integrity resources, then developing a new series of student-based feedback to shape the content of the module, and finally collecting student evaluations (sample size: 170 students). The results showed significant improvements in the accessibility, usefulness and comprehensibility of the new resources, as well as a significant increase in students' confidence levels in academic integrity. Focusing on online modules on academic integrity can have a positive impact on student attitudes and reduce potentially unethical behavior.

Design and implementation of an online module with interactive activities and learning resources to support students' academic integrity development with student feedback. To test the effectiveness of the online module in increasing students' awareness and knowledge of academic integrity, postgraduate students at a university conducted focus an online survey to explore their views and understanding of academic integrity. In the questionnaire survey, students were asked about key issues: their general understanding of the principles and concepts of academic integrity, the support they have received to date regarding academic integrity. A series of resources have been developed based on student feedback from the first phase, aimed at improving accessibility, as well as more detailed content and support on academic integrity education. These resources, hosted in an online module, include an interactive video embedding students' academic integrity and other key messages, a gamified academic integrity quiz containing scenario questions; a FAQ document for queries related to academic integrity; an electronic booklet containing detailed examples of commonly occurring academic integrity issues and their solutions; and terminology related to academic integrity, delivery format and tone of communication. Students found that terminology about academic integrity was often complex and less engaging; they suggested that academic integrity information should include analyses of real-life examples, as well as scenario-based questions that were easy to understand and seemingly easy to relate to. They also suggested that academic integrity content should be delivered in a more engaging way, suggesting interactive videos, humorous online brochures, and question and answer sessions.

Shane, M. J. et al. (2018)[12] call for universities to move beyond the past of merely providing information about academic integrity and engage students by integrating education and support into academic programmes. Existing research recognises two main approaches to preventing student academic dishonesty: punitive and educational. The punitive approach is to ‘discourage students from committing infractions through the threat of punishment’, while the educational approach is to "reduce the likelihood of students committing infractions by providing them with relevant skills and knowledge to reduce the likelihood of students committing infractions". Smyth, L.S. et al (2009)[13] emphasise the need for universities to provide consistent and sustained teaching for students before resorting to harsh punishments.Sheard, J. et al. (2003)[14] argue that universities need to take more responsibility for educating students on how to be honest and explaining how to correctly cite sources. The effects of academic

dishonesty are numerous, affecting the integrity of the learning process, the long-term behavior of individuals and the ability of academic institutions to achieve their stated goals. A student's perception of the severity of cheating behavior affects the frequency and likelihood of cheating. For example, if a student perceives plagiarism in an exam as trivial, the frequency of such activity will be higher. A student who does not perceive certain cheating behaviors as unethical is more likely to cheat. Cizek (2012) defined academic cheating as actions taken before, during, or after exams and assignments that are intended to gain an unfair advantage or produce inaccurate results.

Educational approaches to academic integrity are more effective than punitive measures. A major barrier to students' understanding of academic integrity is the lack of concrete examples of definition-driven terminology, suggesting that universities should avoid complex language related to academic integrity and instead provide statements as well as definitions of academic dishonesty. An online academic integrity module has been shown to be an effective intervention strategy to increase student awareness and understanding of concepts, procedures, and policies related to academic integrity. This suggests that academic integrity education programmes can positively influence student attitudes and reduce undermining of academic integrity. The online academic integrity module significantly improved aspects of the academic integrity resource, particularly in terms of usefulness and understanding of student perspectives. Students' confidence in their knowledge of academic integrity concepts increased significantly, demonstrating the importance of establishing early intervention and implementing a consistently accessible online programme to promote academic integrity in higher education.

Gian et al. (2020) found that ethical beliefs strongly influenced students' academic dishonesty, meaning that the amount of academic fraud committed by students was determined by their perceived importance of ethical competence. Honor codes are effective in clearly identifying ethical and unethical behavior and reducing academic dishonesty. Institutions have a responsibility to entice students into their learning and teaching methods and to provide clear guidance, support and learning opportunities. Academic integrity greatly affects the student experience, the quality of the degree, and the development of student competencies and values. Academic integrity is an essential component of learning excellence and how an institutional culture of academic integrity is established should be a major factor in any university's learning excellence strategy. Contextual factors such as environment, workload and grade motivation can lead to reliance on dishonest behavior. Student experiences also play a role, with negative experiences such as poor course design and lack of technical support increasing frustration and anxiety about the course. Therefore, institutional approaches need to assess students' needs for differentiated approaches based on their backgrounds, contextual factors and experiences.

If you are unfamiliar with the concepts of academic integrity, plagiarism, and citation, your need for the first year will be to develop an expectation and use of academic practices at the institution related to these concepts. Building this capacity includes the development of an academic integrity course, which is required in the first year of enrolment. It is important to implement a fair and transparent system when dishonest behavior occurs, allowing for penalties where necessary, but most importantly for students to understand why such behavior is considered dishonest. Students are reminded of the importance of academic integrity when they are given a reflective survey to check their understanding of academic integrity and whether they have experienced challenges or difficulties in applying the principles of academic integrity and reflecting on their own ability to do so. They also develop competence as they follow students' reflections, shared experiences and guided learning, which means that we should look carefully at how we approach course practice, assessment and teaching, and the management and support we provide. As practice in many institutions has a direct impact on students' academic integrity and dishonesty, it is important to consider how

to build competence into the organisational culture around academic integrity and actively promote this culture in a number of ways. We need to think about the teaching of academic integrity courses which should not focus on infractions but on building the competencies and values that students explicitly and implicitly demand. Lack of academic skills, insufficient knowledge of plagiarism, and student unconsciousness of learning expectations are additional drivers of a cheating level playing field. Use additional guidelines for plagiarism prevention, e-content recommendations, additional training.

The questionnaire contained three sets of questions based on a Likert scale: describing the profile of the respondent, determining the participants' confidence in their understanding of referencing, plagiarism and the use of bibliographies, and the ability to correct scientific writing. Every higher education institution has some policies related to academic integrity, but whether they are consistently followed is a grey area. Beckeretal(2006) argues that three factors are required for cheating to occur: opportunity, incentive and attitude. Opportunity occurs when lecturers ignore the occurrence of cheating, allowing students to take the opportunity to cheat without fear of being caught. A student's desire to get good grades, to compete with their friends, and to succeed is a motivation to cheat. Due to the competitive job market, students are under high pressure or competing with their peers, or the high cost of education forces them to do this behavior. The results of the assessments students receive play a key role in shaping their future careers as well as their economic and social prospects, so the pressure to cheat to achieve high grades may become an attractive option for many students. Improving students' sense of morality can help to reduce academic dishonesty, and the most important determinant of whether a student cheats is their moral anchoring.

Teachers' enthusiastic attitudes and proactive approaches during teaching and learning can help reduce the likelihood of student cheating. It is hypothesised that active learning strategies can have a significant positive injection into students' attitudes and prevent potential dishonest behavior. Studies such as Jordan (2001), Nora & Zhang (2010) and Khan (2014) have shown that intrinsic motivation and repentance can prevent students from engaging in dishonest behavior. The incidence of cheating depends on how seriously students take cheating, and students record more incidents of plagiarism on exams if they do not think it is important. When a culture of tolerance emerges as a result of a shift in student attitudes, cheating becomes normalised and the more students believe their classmates cheat, the less blameworthy and morally wrong cheating becomes. The ethos or culture of the school may influence students' propensity to cheat, which also gives them an unfair advantage over other students. Academic dishonesty can lead to a loss of integrity within the school and students have less respect for moral values. Research has shown that a strong honor code has a positive effect in controlling academic cheating, which can be reduced through an honor code.

This study was inspired by rational choice theory as this is well suited to investigating the factors that contribute to exam cheating. According to this theory, people weigh their options and make the choice they believe is in their best interest. Rational choice theory considers dishonest behavior as a rational existential decision, where the final decision is made after weighing the benefits, risks and efforts associated with a particular behavior. Therefore, the decision to cheat on an exam is based on a cost-benefit analysis, which involves making an effort to cheat rather than study. Other benefits may include improving grades in a shorter period of time compared to taking the time to complete these academic tasks. Rational choice theory has great potential to explain academic cheating and the findings confirm previous research, for example students' educational institutions were found to be involved in academic cheating because the relative benefits outweighed the costs, which also suggests that many students may engage in academic cheating simply because the severity of the sanction may be less severe than the benefits gained. Sattler et al. (2013) also found that when the the benefits of dishonest academic behavior outweigh the sanctions, the behavior will continue. According to self-determination theory, individuals derive their behavior from both internal

and external motivations. Internal motivation is based on the need for self-satisfaction and competence, while external motivation comes from external rewards or punishments.

The growing concern about student integrity in higher education is attributed to the increasing number of reported cases, stories and scandals of corruption, academic misconduct and other integrity violations in HEIs globally . Possible causes of the integrity crisis include, but are not limited to, the expansion of higher education, changes in the values underpinning higher education, the marketisation of higher education, and the evolution of the internet and social media. Integrity education can have a positive impact on students' knowledge, opinions, attitudes and behaviors. Integrity education is an attempt, usually referred to as an intentionally designed educational programme, to promote the moral development of students. Creating a healthy and supportive learning environment for students and establishing institutional policies requires the combined efforts of all stakeholders in higher education. When students have access to knowledge about integrity and see the commitment of all parties to integrity, integrity is more likely to be followed. In addition to policy development and environment building at the institutional level, higher education institutions can create and provide platforms such as seminars and events for students to openly discuss issues of trustworthiness and integrity and exchange information with other students, colleges and universities.

As Vandehey et al. (2007) assert, students' fear of being caught and punished for cheating is a far more effective deterrent to academic misconduct than students' internal feelings about the behavior. According to Petris (2003), if a student is caught cheating and given a stern warning, the behavior is more likely to be reduced. Levy & Rakovsky (2007) also added that students' involvement in academic dishonesty was reduced when they knew that cheating would be detected and severely punished. The main purpose of this study was to examine the determinants of academic misconduct among Chinese university students. Although this study is based on a sample from a single Chinese university, the findings have broad implications for the teaching and classroom management of foreign faculty in China and for global education in general. Ethics education, especially in classroom discussions, must reinforce and change students' ethical standards, and by sharing and discussing the phenomenon of cheating and ethical issues in the classroom, teachers can help to guide and establish students' values and standards of integrity. Informing students of data on cheating behavior of their peers can help them develop an appropriate ethical value system. The most important educational goals include acquiring scientific thinking and research skills based on ethical values, and academic integrity is one of the fundamental values of education. Although plagiarism is a serious problem, it can be avoided by first identifying the causes of plagiarism and then applying appropriate methods to prevent it. Lin (2013) identified three factors associated with fraud: lack of severe penalties in the evaluation system, overreaching for personal profit, and lack of scientific ethics.

Academic misconduct, academic fraud and academic deception are sometimes interchangeable in the study of academic integrity, and as such, assessments of academic honesty require a variety of definitions and interpretations, including historical, literal and figurative.

By introducing the obtained factors and variables into the model, a structural equation model of the impact of the five factors on academic integrity can be obtained, for which the following assumptions were made:

H1: Educational environment factors can directly influence moral self-regulation factors.

H2: The social environment factor can directly influence the moral self-regulation factor.

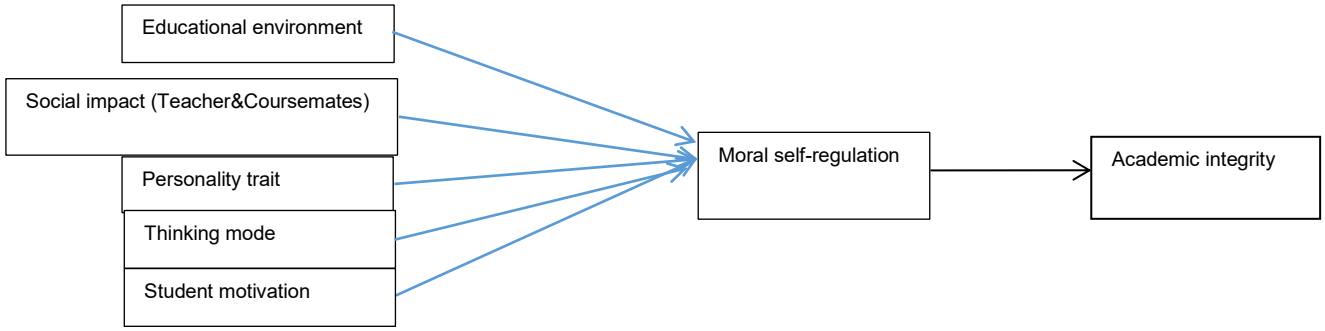
H3: Personality trait factor can directly influence moral self-regulation factor.

H4: The thinking pattern factor can directly influence the moral self-regulation factor.

H5: The student motivation factor can directly influence the moral self-regulation factor.

H6: Moral self-regulation factor can directly influence academic integrity factor.

Using the structural equation modelling analysis software Amos, the model was analysed based on the set of assumptions described above. After setting up the causal path diagram in the software interface, as shown in **Figure 4-1**, the estimated values of each parameter are obtained by running the software, and the results are shown in **Figure 4-2**. From the figure, we can see the path coefficients of each apparent variable in the model, the path coefficients of the potential variables and the causal path coefficients of each potential exogenous variable on the potential dependent variable, and by observing the standardized coefficients among these variables, we can analyze the relationship between each variable and the strength of their interactions can be analysed, which is conducive to identifying the determinants of the interactions, so as to prevent and solve the problems in a targeted manner.



4. Results and discussion

Demographic information

A total of 642 questionnaires were collected. In terms of gender, 187 questionnaires were collected from males, accounting for 29.1 per cent, and 455 questionnaires were collected from females, accounting for 70.9 per cent, with a large difference in the ratio of males to females. In terms of age, a total of 192 questionnaires were collected from 18-year-old participants, accounting for 29.9 per cent; a total of 243 questionnaires were collected from 19-year-old participants, accounting for 37.9 per cent; a total of 145 questionnaires were collected from 20-year-old participants, accounting for 22.6 per cent; a total of 40 scores were collected from 21-year-old participants, accounting for 6.2 per cent; and a total of 22 scores were collected from 22-year-old participants, accounting for 3.4 per cent. In terms of grade level, a total of 219 questionnaires were collected from freshman participants, accounting for 34.1 per cent; 362 questionnaires were collected from sophomore participants, accounting for 56.4 per cent; 47 questionnaires were collected from junior participants, accounting for 7.3 per cent; 5 questionnaires were collected from senior participants, accounting for 0.8 per cent; and 9 questionnaires were collected from graduating participants, accounting for 1.4 per cent.

Table 4.1. Demographic information.

entry	options	frequency	percent/%	Effective percentage/%
sexes	male	187	29.1	29.1
	female	455	70.9	70.9
age	18	192	29.9	29.9
	19	243	37.9	37.9
	20	145	22.6	22.6
	21	40	6.2	6.2

entry	options	frequency	percent/%	Effective percentage/%
grade	22	22	3.4	3.4
	first-year	219	34.1	34.1
	second-year	362	56.4	56.4
	third-year	47	7.3	7.3
	fourth-year	5	0.8	0.8
	graduated	9	1.4	1.4

Table 4.1. (*Continued*)

descriptive statistics

The questionnaire contains 6 scales with 7 parts, which are Demographic Information, Educational Environment Scale, Social Environment Scale, Personality Traits Scale, Thinking Patterns Scale Student Motivation Scale, Moral Self-Regulation Scale and Academic Integrity Scale. Among them, the scales correspond to the topics of category A, B, C, D, E, F, and G, respectively. The related serial number and topic relationships are specified in the table below:

Table 4.2. Serial number correspondence.

serial number	title
A1	It is easy for me to copy/paste due to advanced technology
A2	I know how to cite electronic information
A3	It is easy to extract documents, information, data from the website
A4	Under stress makes me afraid I will not graduate. Thus, I tend to cheat to pass my exams
A5	Money pressure makes me afraid I will not graduate. Thus, I cheat s so that I will pass my exams.
A6	I am aware that incidents of academic dishonesty are increasing
A7	Sometimes I am tempted to plagiarize，because everyone else is doing it .
B1	Family pressure makes me afraid I will not graduate. Therefore, I cheat in exams and assignments.
B2	Peer pressure makes me afraid I will not graduate. Therefore, I cheat in exams and assignments.
B3	Faculty pressure makes me afraid I will not graduate. Therefore, I cheat in exams and assignments.
B4	I do not want to look stupid in front of peers. Therefore, I cheat in exams and assignments.
B5	I do not want to look stupid in front of my professor. Therefore, I cheat in exams and assignments.
B6	I do not want to embarrass my family. Therefore, I cheat in exams and assignments.
B7	If my roommate gives me permission to use his or her paper for one of my classes, I do not think there is anything wrong with doing that.
B8	I have witnessed any incidents of academic dishonesty in the past
B9	I have ever handed in an assignment that someone else completed on your behalf (at the post-secondary level).
B10	I am well aware of the University's policy on academic dishonesty.
B11	Plagiarism is justified if I currently have more important obligations or tasks to do.
B12	I think my instructors/advisor make too much fuss about plagiarism
C1	The penalties are minor if I plagiarise
C2	I am unable to cope with the workload. Plagarising is the easy way out.
C3	I could not write a scientific paper without plagiarizing
C4	If one cannot write well in a foreign language (eg, English), it is justified to copy parts of a similar paper already
C5	Those who say they have never plagiarized are lying.

serial number	title
C6	I do not feel guilty for copying verbatim a sentence or two from my previous papers.
C7	Sometimes, it is necessary to plagiarize.
C8	I know accurately what constitutes plagiarism and what does not.
C9	Plagiarism is not against my ethical values.
C10	Because plagiarism involves taking another person's words and not his or her material goods, plagiarism is no big deal.
C11	I believe that student academic honesty is not important.
C12	I am aware that plagiarism is as bad as stealing the final exam ahead of time and memorising the answers.
C13	If I lend a paper to another student to look at, and then rephrasing my work. If the student is caught, I should not be punished.
C14	I do not feel guilty for copying a sentence word by word.
D1	It is hard for me to find information sources on the web
D2	I can easily combine information from multiple sources
D3	My reading comprehension skills are weak
D4	My writing skills are weak
D5	I sometimes have difficulty expressing my own ideas
D6	I do not want my competences to be judged or caompare to others
D7	I find it difficult to learn and achieve my self-set standards
D8	Assigned academic work will not help me personally/professionally
D9	I do not want to learn anything, just pass
D10	It is easier to plagiarise than to study
D11	It is alright to use other people's work without citing the source
D12	Plagiarized parts of a paper may be alright if the paper is of great scientific value
D13	Self-plagiarism should not be punishable in the same way as plagiarism is.
D14	A plagiarised paper does no harm academically.
D15	Sometimes I copy a sentence or two just to be inspired for further writing.
D16	Punishment for plagiarism in college should be light because students are young people just learning the ropes
D17	I think it is not important to avoid plagiarism
D18	I know how to keep away from committing plagiarism
E1	I find it difficult to access to new technologies
E2	I find it difficult to translate information from other languages
E3	I will not get caught on plagiarism
E4	I am not aware of penalties if i plagiarism
E5	I do not understand the consequences of plagiarism
E6	The gains are higher than the losses if i plagiarism
E7	I plagiarise because I run out of time
E8	I do not know how to cite the literatures
E9	I do not know how to find research materials
E10	I do not know how to do research
E11	The tasks are too difficult for me

serial number	title
E12	I have too many assignments in a short amount of time
E13	I am afraid to fail and unable to graduate, so I plagarise.
E14	I do not want to embarrass myself
E15	I fear asking for help to others
E16	My fear of performing poorly motivates me to plagiarise
E17	Short deadlines give me the right to plagiarise a bit.
E18	Plagiarism is not a big deal.
E19	Plagiarism is justified if the professor assigns too much work to the course.
E20	Copying from public material without citing is alright.
E21	I did the same assignment and giving the same answer with several other students without the instructor's permission is alright.
E22	I often provide another student the answers when they need during exam.
E23	Copying answers from another student in an examination is alright.
E24	Taking with me unauthorised material, such as notes, into an examinaton is alright.
F1	I am satisfied with my moral self-control.
F2	I will adjust my behavior to remain consistent with personal ethical standards.
F3	schools are very helpful when it comes to helping us improve our moral self-regulation.
F4	I have participated in many moral education courses or activities at university.
F5	I feel that moral education has been integrated into the university curriculum and campus culture.
F6	I would like to continue to participate in future moral education activities on campus.
F7	I often reflect on whether my behavior is ethical.
F8	I will abandon my personal moral judgement because of group pressure.
F9	In my daily life, I have regular habits or rituals to strengthen my moral self-control.
F10	I believe that moral education and cultivation is very important for personal development.
G1	I think academic integrity is very important in academic research.
G2	I am well aware of the norms and requirements related to academic integrity.
G3	I do agree with the current level of penalties for academic misconduct.
G4	I believe that academic integrity education is very effective in preventing academic misconduct.
G5	I am very satisfied with my assessment of the current state of academic integrity in academia.
G6	I am well aware of what academic misconduct consists of.
G7	I have ever found academic misconduct.

Table 4.2. (*Continued*)

Quality test is a test of normal distribution of questionnaire data by examining the sample data size, maximum, minimum, mean, standard deviation, bias and kurtosis. It has a crucial impact on the subsequent analyses. Scholar Klein advocates that when the sample obeys a normal distribution, the absolute value of its skewness should be less than 3 the absolute value of kurtosis should be less than 10. The table shows the results of statistical analysis of each question item in the questionnaire, including sample size, maximum and minimum values, mean, standard deviation, skewness, and windiness. The items satisfy the conditions that the absolute value of skewness is less than 3 and the absolute value of kurtosis is less than 10, which indicates that the questionnaire items in this study obey a normal distribution. The questionnaire data are

valid and can be applied to statistical analyses such as reliability and validity. The details are shown in **Table 4-3**:

Table 4.3. Quality analysis.

serial number	minimum value	maximum values	average value	standard deviation	skewness	kurtosis
A1	1.00	5.00	3.06	0.81	-0.09	-0.84
A2	1.00	5.00	3.00	0.73	-0.14	-0.37
A3	1.00	5.00	2.99	0.71	-0.02	-0.48
A4	1.00	5.00	3.00	0.74	0.01	-0.54
A5	1.00	5.00	3.02	0.75	-0.09	-0.31
A6	1.00	5.00	2.97	0.74	0.09	-0.53
A7	1.00	5.00	3.00	0.75	0.05	-0.46
B1	1.00	5.00	3.06	0.80	-0.06	-0.87
B2	1.00	5.00	3.05	0.72	0.06	-0.31
B3	1.00	5.00	3.06	0.72	-0.09	-0.66
B4	1.00	5.00	3.10	0.70	-0.06	-0.62
B5	1.00	5.00	3.02	0.73	0.16	-0.48
B6	1.00	5.00	3.03	0.74	-0.12	-0.44
B7	1.00	5.00	3.06	0.76	0.01	-0.78
B8	1.00	5.00	3.04	0.71	0.03	-0.34
B9	1.00	5.00	3.05	0.73	-0.08	-0.59
B10	1.00	5.00	3.02	0.71	0.11	-0.34
B11	1.00	5.00	3.07	0.71	0.01	-0.61
B12	1.00	5.00	3.03	0.72	0.05	-0.55
C1	1.00	5.00	2.96	0.83	0.07	-0.89
C2	1.00	5.00	2.99	0.75	0.01	-0.59
C3	1.00	5.00	2.98	0.75	0.05	-0.42
C4	1.00	5.00	2.99	0.75	-0.03	-0.54
C5	1.00	5.00	3.00	0.74	-0.12	-0.44
C6	1.00	5.00	2.96	0.75	-0.07	-0.74
C7	1.00	5.00	2.96	0.74	0.03	-0.60
C8	1.00	5.00	3.01	0.75	0.03	-0.48
C9	1.00	5.00	2.94	0.74	0.08	-0.50
C10	1.00	5.00	2.99	0.74	0.06	-0.57
C11	1.00	5.00	2.95	0.74	0.03	-0.47
C12	1.00	5.00	2.95	0.73	0.10	-0.66
C13	1.00	5.00	2.97	0.74	0.05	-0.43
C14	1.00	5.00	2.95	0.76	0.08	-0.66
D1	1.00	5.00	3.03	0.83	0.06	-0.87
D2	1.00	5.00	3.03	0.77	0.07	-0.77

serial number	minimum value	maximum values	average value	standard deviation	skewness	kurtosis
D3	1.00	5.00	3.04	0.76	0.05	-0.42
D4	1.00	5.00	3.01	0.76	0.14	-0.30
D5	1.00	5.00	3.01	0.75	0.00	-0.58
D6	1.00	5.00	3.04	0.74	0.11	-0.47
D7	1.00	5.00	3.02	0.76	-0.03	-0.37
D8	1.00	5.00	3.03	0.75	-0.04	-0.52
D9	1.00	5.00	3.00	0.78	0.06	-0.57
D10	1.00	5.00	3.00	0.75	-0.03	-0.53
D11	1.00	5.00	3.02	0.76	-0.01	-0.68
D12	1.00	5.00	3.04	0.76	0.01	-0.29
D13	1.00	5.00	3.03	0.75	0.04	-0.52
D14	1.00	5.00	3.06	0.74	0.10	-0.21
D15	1.00	5.00	3.05	0.75	-0.01	-0.44
D16	1.00	5.00	3.01	0.76	-0.06	-0.49
D17	1.00	5.00	2.96	0.72	0.06	-0.25
D18	1.00	5.00	3.03	0.74	-0.12	-0.35
E1	1.00	5.00	3.01	0.85	-0.01	-0.98
E2	1.00	5.00	3.02	0.77	0.02	-0.53
E3	1.00	5.00	3.02	0.74	0.00	-0.45
E4	1.00	5.00	3.01	0.75	0.00	-0.45
E5	1.00	5.00	3.01	0.78	-0.03	-0.60
E6	1.00	5.00	3.01	0.74	-0.01	-0.67
E7	1.00	5.00	3.04	0.76	-0.02	-0.58
E8	1.00	5.00	3.02	0.75	-0.15	-0.39
E9	1.00	5.00	3.05	0.76	0.02	-0.90
E10	1.00	5.00	3.04	0.74	-0.04	-0.50
E11	1.00	5.00	3.02	0.77	0.00	-0.56
E12	1.00	5.00	3.03	0.77	-0.13	-0.67
E13	1.00	5.00	3.02	0.74	-0.17	-0.38
E14	1.00	5.00	3.04	0.75	0.06	-0.53
E15	1.00	5.00	3.02	0.74	0.04	-0.47
E16	1.00	5.00	2.99	0.73	0.01	-0.73
E17	1.00	5.00	3.02	0.78	0.05	-0.34
E18	1.00	5.00	3.01	0.76	0.09	-0.53
E19	1.00	5.00	3.01	0.72	-0.10	-0.59
E20	1.00	5.00	3.01	0.75	-0.02	-0.36
E21	1.00	5.00	3.02	0.74	-0.01	-0.51
E22	1.00	5.00	3.00	0.73	0.05	-0.61
E23	1.00	5.00	3.00	0.73	-0.06	-0.60

serial number	minimum value	maximum values	average value	standard deviation	skewness	kurtosis
E24	1.00	5.00	3.04	0.72	-0.03	-0.73
F1	1.00	5.00	2.99	0.84	0.06	-0.89
F2	1.00	5.00	3.01	0.75	0.13	-0.56
F3	1.00	5.00	3.02	0.72	0.06	-0.55
F4	1.00	5.00	3.00	0.74	0.01	-0.63
F5	1.00	5.00	3.00	0.75	-0.05	-0.37
F6	1.00	5.00	3.01	0.77	-0.03	-0.65
F7	1.00	5.00	3.00	0.72	-0.04	-0.51
F8	1.00	5.00	3.00	0.76	-0.02	-0.50
F9	1.00	5.00	3.00	0.76	-0.17	-0.38
F10	1.00	5.00	3.00	0.77	0.09	-0.53
G1	1.00	5.00	3.04	0.84	-0.07	-0.96
G2	1.00	5.00	2.97	0.77	0.02	-0.82
G3	1.00	5.00	3.02	0.76	-0.13	-0.44
G4	1.00	5.00	3.04	0.78	-0.03	-0.64
G5	1.00	5.00	2.99	0.74	0.02	-0.57
G6	1.00	5.00	3.02	0.76	-0.04	-0.56
G7	1.00	5.00	3.04	0.75	-0.06	-0.52

Table 4.3. (*Continued*)

5. Exploratory factor analysis

Before the statistical analysis of the questionnaire-based survey research, the reliability and validity of the questionnaire are measured through a pre-survey to study the reliability and accuracy of the questionnaire results. Reliability mainly measures the precision, stability and consistency of the scale, i.e., the magnitude of the degree of variation caused by random errors in the measurement process, and we used the reliability index of internal consistency, which refers to the consistency between all items within the questionnaire, usually using Cronbach's alpha coefficient. For the reliability analysis of this questionnaire we used the following avenues for illustration: reliability analysis of the data from 642 surveys distributed in the university student population using SPSS. In **Table 4-4**, the minimum value of the unstandardised Alpha coefficient is 0.907 and the minimum value of the standardised Alpha coefficient is 0.907, both of which are greater than 0.9, which indicates that the questionnaire is highly reliable.

Table 4.4. Reliability analysis.

meters	Unstandardised Cronbach Alpha	Standardised Clonebach Alpha	Number of questions
summary table	0.971	0.971	92
educational environment	0.907	0.907	7
social impact	0.931	0.931	12
personality trait	0.948	0.948	14
Thinking mode	0.961	0.96	18
student motivation	0.969	0.969	24

meters	Unstandardised Cronbach Alpha	Standardised Clonebach Alpha	Number of questions
Moral self-regulation	0.931	0.93	10
academic integrity	0.91	0.91	7

Table 4.4. (*Continued*)

Based on the questions designed for the scales, factor analyses were conducted separately for the overall and each scale to test the reasonableness of the sample data. If the value of KMO tends to be closer to 1, it means that the data are more suitable for factor analysis. The total KMO of this study is 0.972 and the minimum KMO value is 0.929, which is greater than 0.9 and close to 1, indicating that the data are suitable for factor analysis. The Sig value of Bartlett's test is 0.000, which is smaller than the significance level of 0.05, therefore the hypothesis of irrelevance is rejected, indicating that there is a correlation between the variables and they are suitable for factor analysis.

Table 4.5. Validity.

meters	KMO	approximate chi-square	degrees of freedom	significance
summary table	0.972	41118.92	4186	0
educational environment	0.929	2532.951	21	0
social impact	0.969	4289.006	66	0
personality trait	0.977	5859.33	91	0
Thinking mode	0.986	8030.596	153	0
student motivation	0.989	10914.45	276	0
Moral self-regulation	0.963	3920.762	45	0
academic integrity	0.929	2619.09	21	0

Common method biases refer to artificial covariation between predictor variables and validity variables due to the same data sources or raters, the same measurement environment, the context of the project, and the characteristics of the project itself. This artificial covariation is a form of systematic error that produces serious confounding of the findings and is potentially misleading to the conclusions. Covariation bias is widespread in psychological and behavioral science research, especially research using questionnaires, and has attracted the attention of an increasing number of researchers.

Dandan Tang in 'Common Method Bias Test: Issues and Suggestions' mentions the Harman's one-way method, which is commonly used in Exploratory Factor Analysis (EFA) to test for CMB. The EFA method assumes that there is a single method factor that The EFA approach assumes that there is one methodological factor that explains the common variance of all items across traits in a study. The more variance explained by the method factor, the more serious the bias is. Podsakoff and Organ (1986) considered that the CMB was not serious if the single factor explained no more than 50 per cent of the variance obtained with the EFA (unrotated). Based on domestic applications, it is generally considered that the variance explained by a single factor should not exceed 40 per cent. However, both the 50 per cent and 40 per cent evaluation criteria are empirical criteria.

The results in **Table 4-6** show that the highest unrotated factor explanations for the seven extracted factors were 28.121%, all of which were less than 40%, suggesting artificial covariation between the predictor variables and the effector variables.

Table 4.6. Total variance explained.

ingredient	Initial eigenvalue			Extract the sum of the squares of the loads		
	total	Percentage of variance	accumulate %	total	Percentage of variance	accumulate %
1	25.871	28.121	28.121	25.871	28.121	28.121
2	7.959	8.651	36.771	7.959	8.651	36.771
3	6.278	6.824	43.595	6.278	6.824	43.595
4	4.914	5.342	48.937	4.914	5.342	48.937
5	4.228	4.596	53.533	4.228	4.596	53.533
6	3.346	3.637	57.17	3.346	3.637	57.17
7	3.025	3.288	60.458	3.025	3.288	60.458
8	0.845	0.918	61.377			
9	0.794	0.863	62.24			
10	0.786	0.855	63.095			
11	0.753	0.819	63.913			
12	0.727	0.79	64.703			
13	0.723	0.786	65.489			
14	0.699	0.76	66.249			
15	0.685	0.745	66.994			
16	0.678	0.737	67.731			
17	0.67	0.728	68.46			
18	0.664	0.722	69.181			
19	0.646	0.702	69.883			
20	0.64	0.696	70.579			
21	0.624	0.678	71.257			
22	0.618	0.671	71.928			
23	0.6	0.652	72.581			
24	0.58	0.631	73.211			
25	0.574	0.623	73.835			
26	0.571	0.62	74.455			
27	0.561	0.61	75.065			
28	0.55	0.598	75.663			
29	0.546	0.594	76.257			
30	0.538	0.585	76.842			
31	0.534	0.581	77.422			
32	0.522	0.567	77.99			
33	0.519	0.565	78.554			
34	0.508	0.553	79.107			
35	0.498	0.541	79.648			
36	0.494	0.537	80.185			

ingredient	Initial eigenvalue			Extract the sum of the squares of the loads		
	total	Percentage of variance	accumulate %	total	Percentage of variance	accumulate %
37	0.486	0.528	80.713			
38	0.482	0.524	81.236			
39	0.48	0.522	81.759			
40	0.47	0.511	82.27			
41	0.468	0.509	82.779			
42	0.457	0.496	83.275			
43	0.452	0.492	83.767			
44	0.448	0.487	84.254			
45	0.439	0.477	84.731			
46	0.432	0.47	85.202			
47	0.432	0.469	85.671			
48	0.424	0.461	86.132			
49	0.415	0.451	86.583			
50	0.41	0.446	87.029			
51	0.404	0.44	87.468			
52	0.401	0.436	87.904			
53	0.395	0.43	88.334			
54	0.391	0.425	88.759			
55	0.382	0.416	89.175			
56	0.38	0.413	89.588			
57	0.373	0.406	89.994			
58	0.365	0.397	90.391			
59	0.359	0.39	90.781			
60	0.354	0.385	91.165			
61	0.346	0.377	91.542			
62	0.34	0.37	91.912			
63	0.337	0.366	92.278			
64	0.335	0.364	92.642			
65	0.326	0.354	92.996			
66	0.319	0.347	93.343			
67	0.315	0.343	93.686			
68	0.311	0.338	94.024			
69	0.308	0.335	94.359			
70	0.299	0.325	94.685			
71	0.296	0.322	95.007			
72	0.295	0.321	95.327			
73	0.287	0.312	95.639			

ingredient	Initial eigenvalue			Extract the sum of the squares of the loads		
	total	Percentage of variance	accumulate %	total	Percentage of variance	accumulate %
74	0.282	0.307	95.946			
75	0.28	0.305	96.251			
76	0.262	0.285	96.536			
77	0.258	0.28	96.817			
78	0.254	0.276	97.093			
79	0.252	0.274	97.367			
80	0.245	0.266	97.633			
81	0.237	0.258	97.891			
82	0.233	0.253	98.144			
83	0.224	0.244	98.388			
84	0.22	0.239	98.627			
85	0.205	0.222	98.849			
86	0.201	0.219	99.068			
87	0.179	0.195	99.263			
88	0.155	0.168	99.431			
89	0.144	0.157	99.587			
90	0.13	0.141	99.729			
91	0.126	0.137	99.866			
92	0.123	0.134	100			

Table 4.6. (*Continued*)

Extracting dimension factors provides insight into the underlying structure and relationships between observed variables in complex data sets, identifying hidden factors or dimensions behind the data that are not easily observed directly. These factors can explain the covariance or correlation between observed variables. Second, dimensionality factors help to reduce the dimensionality of the data and simplify the analysis process, enough to improve the efficiency and accuracy of data analysis. More importantly, these factors often reflect important theoretical concepts or processes in the field of study, and are essential for constructing and validating theoretical models.

Table 4.7. Total variance explained.

ingredient	Initial eigenvalue			Rotational load sum of squares		
	total	Percentage of variance	accumulate %	total	Percentage of variance	accumulate %
1	25.871	28.121	28.121	14.261	15.501	15.501
2	7.959	8.651	36.771	10.971	11.925	27.427
3	6.278	6.824	43.595	8.481	9.218	36.645
4	4.914	5.342	48.937	7.007	7.616	44.261
5	4.228	4.596	53.533	6.14	6.674	50.936
6	3.346	3.637	57.17	4.39	4.772	55.707
7	3.025	3.288	60.458	4.371	4.751	60.458

ingredient	Initial eigenvalue			Rotational load sum of squares		
	total	Percentage of variance	accumulate %	total	Percentage of variance	accumulate %
8	0.845	0.918	61.377			
9	0.794	0.863	62.24			
10	0.786	0.855	63.095			
11	0.753	0.819	63.913			
12	0.727	0.79	64.703			
13	0.723	0.786	65.489			
14	0.699	0.76	66.249			
15	0.685	0.745	66.994			
16	0.678	0.737	67.731			
17	0.67	0.728	68.46			
18	0.664	0.722	69.181			
19	0.646	0.702	69.883			
20	0.64	0.696	70.579			
21	0.624	0.678	71.257			
22	0.618	0.671	71.928			
23	0.6	0.652	72.581			
24	0.58	0.631	73.211			
25	0.574	0.623	73.835			
26	0.571	0.62	74.455			
27	0.561	0.61	75.065			
28	0.55	0.598	75.663			
29	0.546	0.594	76.257			
30	0.538	0.585	76.842			
31	0.534	0.581	77.422			
32	0.522	0.567	77.99			
33	0.519	0.565	78.554			
34	0.508	0.553	79.107			
35	0.498	0.541	79.648			
36	0.494	0.537	80.185			
37	0.486	0.528	80.713			
38	0.482	0.524	81.236			
39	0.48	0.522	81.759			
40	0.47	0.511	82.27			
41	0.468	0.509	82.779			
42	0.457	0.496	83.275			
43	0.452	0.492	83.767			
44	0.448	0.487	84.254			

ingredient	Initial eigenvalue			Rotational load sum of squares		
	total	Percentage of variance	accumulate %	total	Percentage of variance	accumulate %
45	0.439	0.477	84.731			
46	0.432	0.47	85.202			
47	0.432	0.469	85.671			
48	0.424	0.461	86.132			
49	0.415	0.451	86.583			
50	0.41	0.446	87.029			
51	0.404	0.44	87.468			
52	0.401	0.436	87.904			
53	0.395	0.43	88.334			
54	0.391	0.425	88.759			
55	0.382	0.416	89.175			
56	0.38	0.413	89.588			
57	0.373	0.406	89.994			
58	0.365	0.397	90.391			
59	0.359	0.39	90.781			
60	0.354	0.385	91.165			
61	0.346	0.377	91.542			
62	0.34	0.37	91.912			
63	0.337	0.366	92.278			
64	0.335	0.364	92.642			
65	0.326	0.354	92.996			
66	0.319	0.347	93.343			
67	0.315	0.343	93.686			
68	0.311	0.338	94.024			
69	0.308	0.335	94.359			
70	0.299	0.325	94.685			
71	0.296	0.322	95.007			
72	0.295	0.321	95.327			
73	0.287	0.312	95.639			
74	0.282	0.307	95.946			
75	0.28	0.305	96.251			
76	0.262	0.285	96.536			
77	0.258	0.28	96.817			
78	0.254	0.276	97.093			
79	0.252	0.274	97.367			
80	0.245	0.266	97.633			
81	0.237	0.258	97.891			

ingredient	Initial eigenvalue			Rotational load sum of squares		
	total	Percentage of variance	accumulate %	total	Percentage of variance	accumulate %
82	0.233	0.253	98.144			
83	0.224	0.244	98.388			
84	0.22	0.239	98.627			
85	0.205	0.222	98.849			
86	0.201	0.219	99.068			
87	0.179	0.195	99.263			
88	0.155	0.168	99.431			
89	0.144	0.157	99.587			
90	0.13	0.141	99.729			
91	0.126	0.137	99.866			
92	0.123	0.134	100			

Table 4. 7. (*Continued*)

By extracting dimensionality factors, researchers are able to reveal the intrinsic links between observed variables more clearly, providing a basis for further hypothesis testing and theory development. In addition, the extraction of dimensionality factors also helps to identify redundant information and noise in the data, thus improving the reliability and validity of data analysis.

A total of seven factors were extracted by maximum variance rotation for the 92 items of data, and the maximum factor explanation after rotation was 15.501 per cent, all of which were less than 40 per cent.

Table 4.8. Rotated factor loadings.

serial number	ingredient						
	1	2	3	4	5	6	7
E1	0.872						
E5	0.748						
E18	0.746						
E17	0.739						
E12	0.739						
E4	0.737						
E6	0.733						
E7	0.733						
E2	0.728						
E21	0.727						
E9	0.727						
E24	0.727						
E20	0.727						
E8	0.726						
E16	0.725						
E14	0.723						
E3	0.722						
E22	0.719						

serial number	ingredient						
	1	2	3	4	5	6	7
E19	0.712						
E11	0.712						
E13	0.71						
E23	0.705						
E10	0.705						
E15	0.701						
D1		0.855					
D11		0.766					
D2		0.745					
D7		0.744					
D9		0.742					
D8		0.739					
D16		0.735					
D10		0.73					
D13		0.73					
D15		0.726					
D12		0.725					
D4		0.725					
D5		0.717					
D17		0.716					
D14		0.711					
D6		0.705					
D3		0.702					
D18		0.694					
C1			0.841				
C14			0.751				
C9			0.73				
C5			0.728				
C10			0.724				
C8			0.722				
C4			0.72				
C6			0.718				
C13			0.717				
C12			0.714				
C2			0.712				
C3			0.708				
C11			0.702				
C7			0.694				
B1				0.846			
B7				0.74			
B12				0.727			

serial number	ingredient						
	1	2	3	4	5	6	7
B11				0.717			
B2				0.71			
B5				0.709			
B6				0.703			
B3				0.701			
B9				0.7			
B10				0.696			
B4				0.691			
B8				0.685			
F1					0.842		
F6					0.737		
F9					0.733		
F5					0.725		
F2					0.724		
F8					0.72		
F3					0.714		
F10					0.709		
F4					0.696		
F7					0.687		
A1						0.815	
A6						0.756	
A5						0.752	
A3						0.742	
A7						0.737	
A2						0.705	
A4						0.686	
G1							0.828
G4							0.752
G2							0.744
G7							0.735
G5							0.702
G3							0.697
G6							0.694

Table 4.8. (*Continued*)

6. Structural equation modelling (SEM)

By introducing the obtained factors and variables into the model, a structural equation model of the impact of the five factors on academic integrity can be obtained, for which the following assumptions were made:

H1: The educational environment factor can directly influence the moral self-regulation factor.

H2: The social environment factor can directly influence the moral self-regulation factor.

H3: Personality trait factor can directly influence moral self-regulation factor.

H4: The thinking pattern factor can directly influence the moral self-regulation factor.

H5: The student motivation factor can directly influence the moral self-regulation factor.

H6: Moral self-regulation factor can directly influence academic integrity factor.

Using the structural equation modelling analysis software Amos, the model was analysed based on the set of assumptions described above. After setting up the causal path diagram in the software interface, as shown in **Figure 4-1**, the estimated values of each parameter are obtained by running the software, and the results are shown in **Figure 4-2**. From the figure, we can see the path coefficients of each apparent variable in the model, the path coefficients of the potential variables and the causal path coefficients of each potential exogenous variable on the potential dependent variable, and by observing the standardized coefficients between these variables, we can analyze the relationship and the strength of their interaction, which is conducive to identifying the determinants of mutual influence, so as to target prevention and problem solving. The relationship between each variable and the strength of their interactions can be analysed, which is conducive to identifying the determinants of the interactions, so as to prevent and solve the problems in a targeted manner.

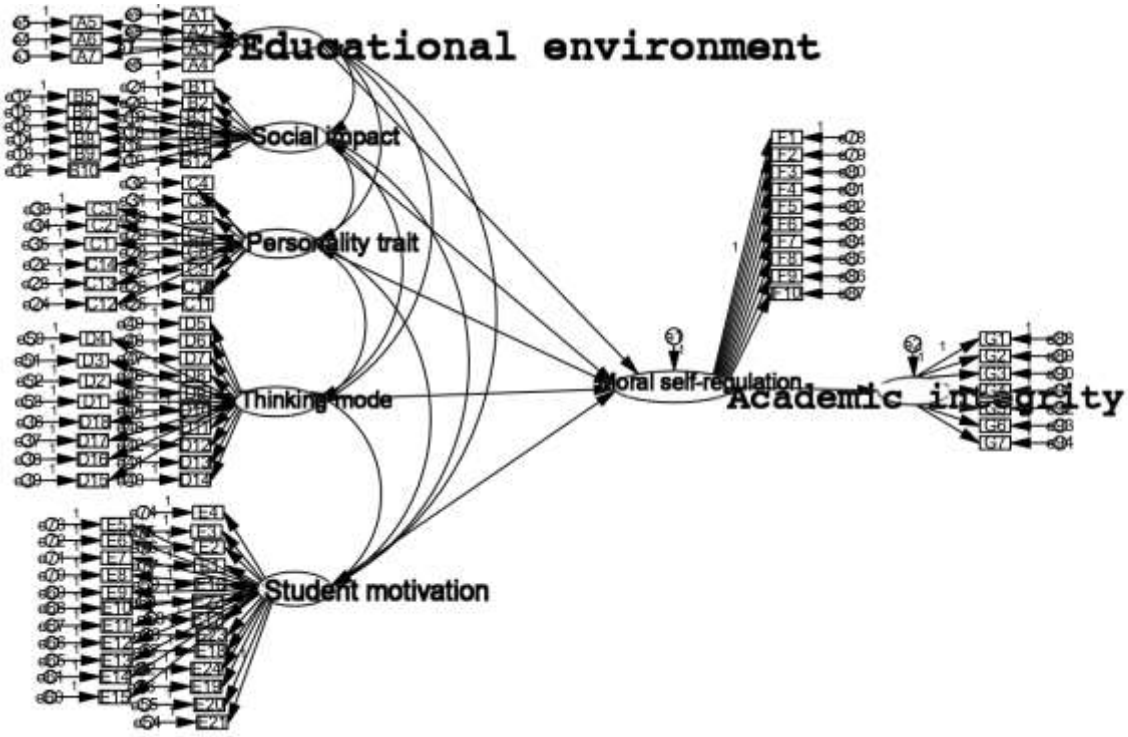


Figure 4.1. Structural equation modelling.

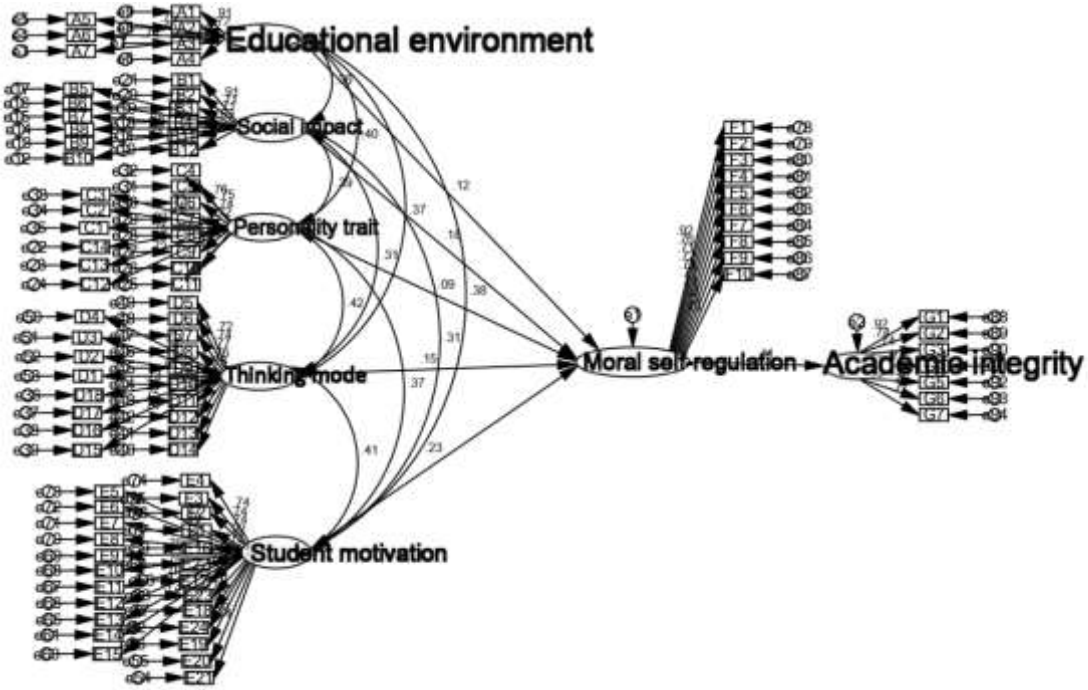


Figure 4.2. Structural equation modelling.

The coefficients fitted to the structural equations are shown in **Table 4-9**. The CMIN/DF is 1.099. The GFI is 0.872, AGFI is 0.865, RMSEA is 0.012, IFI is 0.99, NFI is 0.896, TLI is 0.989, and CFI is 0.99. All the indicators are in accordance with the requirements, except for the GFI, AGFI, and NFI which are close to 0.9.

Table 4.9. Model fit.

goodness-of-fit indicator	standard	Modelling indicators
CMIN/DF	＜3	1.099
GFI	＞0.90	0.872
AGFI	＞0.90	0.865
NFI	＞0.90	0.896
CFI	＞0.90	0.99
IFI	＞0.90	0.99
TLI	＞0.90	0.989
RMR	＜0.05	0.031
RMSEA	＜0.08	0.012

From the table of 4.10 path coefficients, we can see that the influence of educational environment, teachers' peer personality traits thinking patterns, students' motivation on moral self-regulation and moral self-regulation on academic integrity are positive and significant in each path. It shows that each factor has a significant positive effect on moral self-regulation. With the increase of the factors, the stronger moral self-regulation moral and thus have a significant effect on the level of academic integrity.

Table 4.10. Path coefficients.

trails	Unstandardised coefficient	Standardised coefficient	standard error	significance
Moral self-regulation<---educational environment	0.168	0.12	0.06	0.005
Moral self-regulation<---social impact	0.26	0.175	0.062	***
Moral self-regulation<---personality trait	0.128	0.094	0.059	0.03
Moral self-regulation<---Thinking mode	0.217	0.151	0.061	***
Moral self-regulation<---student motivation	0.319	0.227	0.059	***
academic integrity<---Moral self-regulation	0.414	0.412	0.04	***

7. Confirmatory factor analysis

Confirmatory Factor Analysis was conducted for the results of the above exploratory analyses to analyse whether the correspondence between the measurement factors and the scale question options remained consistent with the predictions.

AVE (Average Variance Extracted) and CR (Composite Reliability) are two metrics commonly used in Structural Equation Modelling (SEM) to assess the reliability and validity of measurement models. Among them, AVE is used to measure the extent to which the measured variables explain their underlying variables.CR is used to measure the internal consistency of the measured variables. Generally, an AVE value greater than 0.5 indicates that the measured variable explains its underlying variable well, and a CR value greater than 0.7 indicates that the measured variable has good internal consistency.

The AVE is calculated by the formula:

$$\mathrm{AVE} = \frac{\sum \lambda_i^2}{\sum \lambda_i^2 + \sum \mathrm{var}(\varepsilon_i)}$$

The CR is calculated by the formula:

$$\mathrm{CR} = \frac{(\sum \lambda_i)^2}{\sum \lambda_i^2 + \sum \mathrm{var}(\varepsilon_i)}$$

Convergent validity can be analysed to test the internal consistency of the measurement items under each indicator, verifying that the measurement items belonging to the same indicator at the time of scale design fall under the same indicator at the time of measurement.

This study included seven indicators of educational environment, social impact, personality traits, thinking mode, student motivation on moral self-regulation and academic integrity with a total of 92 measurement items, which were subjected to a validated factor analysis as shown in **Figure 4-3**.

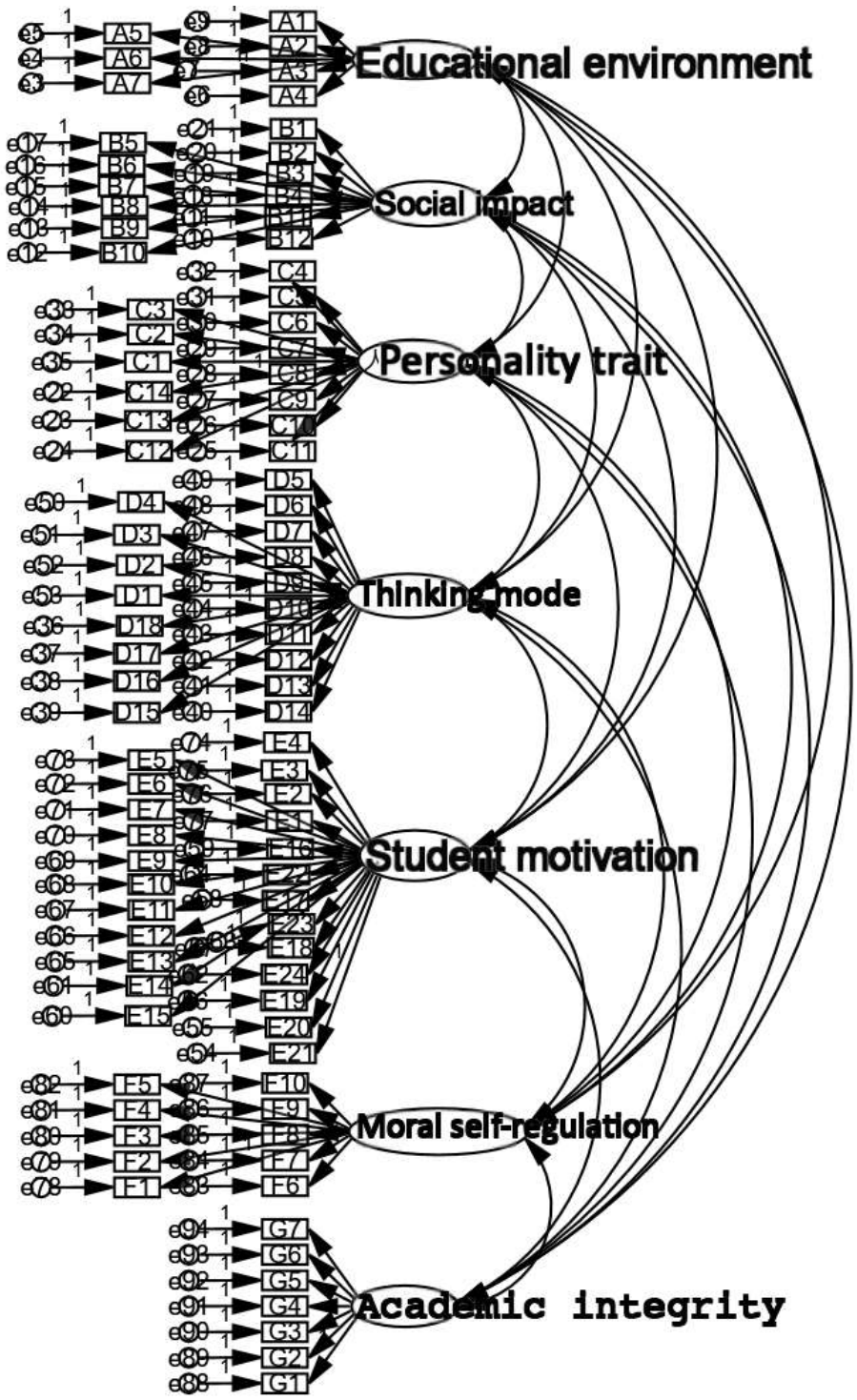


Figure 4.3. Validating the model.

The coefficients fitted to the structural equations are shown in **Table 4-11**. The CMIN/DF is 1.073. The GFI is 0.874, AGFI is 0.868, RMSEA is 0.011, IFI is 0.992, NFI is 0.899, TLI is 0.992, and CFI is 0.992. All the indicators are in accordance with the requirements, except for the GFI, AGFI, and NFI which are close to 0.9.

Table 4.11. Validation model fit.

goodness-of-fit indicator	standard	Modelling indicators
CMIN/DF	＜3	1.073
GFI	＞0.90	0.874
AGFI	＞0.90	0.868
NFI	＞0.90	0.899
CFI	＞0.90	0.992
IFI	＞0.90	0.992
TLI	＞0.90	0.992
RMR	＜0.05	0.016
RMSEA	＜0.08	0.011

From **Table 4-12**, it can be seen that the standardised loadings of each factor are above 0.5, the AVE of each factor is greater than 0.5, and the CR value is greater than 0.7. It shows that the interpretation of each item of the questionnaire scale is good, which is in line with the general standard of internal consistency, and that the convergent validity of each indicator of the model is good.

Table 4.12. Convergence validity.

trails	Standardised path factor	AVE	CR
A7<---educational environment	0.742		
A6<---educational environment	0.758		
A5<---educational environment	0.749		
A4<---educational environment	0.7	0.5855	0.9076
A3<---educational environment	0.754		
A2<---educational environment	0.719		
A1<---educational environment	0.915		
B12<---social impact	0.722		
B11<---social impact	0.708		
B10<---social impact	0.707		
B9<---social impact	0.687		
B8<---social impact	0.679		
B7<---social impact	0.745	0.5315	0.9312
B6<---social impact	0.737		
B5<---social impact	0.717		
B4<---social impact	0.693		
B3<---social impact	0.706		
B2<---social impact	0.71		
B1<---social impact	0.91		
C14<---personality trait	0.753	0.5688	0.9484
C13<---personality trait	0.75		
C12<---personality trait	0.724		
C11<---personality trait	0.731		
C10<---personality trait	0.743		

trails	Standardised path factor	AVE	CR
C9<---personality trait	0.739		
C8<---personality trait	0.728		
C7<---personality trait	0.718		
C6<---personality trait	0.739		
C5<---personality trait	0.748		
C4<---personality trait	0.763		
C3<---personality trait	0.732		
C2<---personality trait	0.754		
C1<---personality trait	0.916		
D18<---Thinking mode	0.728		
D17<---Thinking mode	0.739		
D16<---Thinking mode	0.749		
D15<---Thinking mode	0.74		
D14<---Thinking mode	0.746		
D13<---Thinking mode	0.766		
D12<---Thinking mode	0.749		
D11<---Thinking mode	0.782		
D10<---Thinking mode	0.747	0.5763	0.9607
D9<---Thinking mode	0.759		
D8<---Thinking mode	0.761		
D7<---Thinking mode	0.767		
D6<---Thinking mode	0.737		
D5<---Thinking mode	0.724		
D4<---Thinking mode	0.748		
D3<---Thinking mode	0.745		
D2<---Thinking mode	0.753		
D1<---Thinking mode	0.907		
E24<---student motivation	0.745		
E23<---student motivation	0.754		
E22<---student motivation	0.723		
E21<---student motivation	0.755		
E20<---student motivation	0.757		
E19<---student motivation	0.728		
E18<---student motivation	0.729		
E17<---student motivation	0.735		
E16<---student motivation	0.737		
E15<---student motivation	0.721	0.5642	0.9688
E14<---student motivation	0.744		
E13<---student motivation	0.723		
E12<---student motivation	0.759		
E11<---student motivation	0.75		
E10<---student motivation	0.734		

trails	Standardised path factor	AVE	CR
E9<---student motivation	0.756		
E8<---student motivation	0.741		
E7<---student motivation	0.744		
E6<---student motivation	0.758		
E5<---student motivation	0.771		
E4<---student motivation	0.743		
E3<---student motivation	0.744		
E2<---student motivation	0.738		
E1<---student motivation	0.917		
F1<---Moral self-regulation	0.921		
F2<---Moral self-regulation	0.756		
F3<---Moral self-regulation	0.709		
F4<---Moral self-regulation	0.724		
F5<---Moral self-regulation	0.736	0.5748	0.9307
F6<---Moral self-regulation	0.775		
F7<---Moral self-regulation	0.713		
F8<---Moral self-regulation	0.74		
F9<---Moral self-regulation	0.751		
F10<---Moral self-regulation	0.734		
G1<---academic integrity	0.923		
G2<---academic integrity	0.742		
G3<---academic integrity	0.738		
G4<---academic integrity	0.746	0.5953	0.9109
G5<---academic integrity	0.743		
G6<---academic integrity	0.722		
G7<---academic integrity	0.768		

Table 4.12. (*Continued*)

By analysing the discriminant validity it is possible to test the differences between the indicators and to verify that the measurement items that do not fall under the same indicator at the time of the scale's design are nevertheless part of the same indicator at the time of measurement. From **Table 4-13**, it can be seen that the AVE open root values of the seven factors studied in the text are greater than the correlation coefficients with the other factors, so the study is considered to have discriminant validity.

Table 4.13. Discriminant validity.

	educational environment	social impact	personality trait	Thinking mode	student motivation	Moral self-regulation	academic integrity
educational environment	0.5855						
social impact	0.359	0.5315					
personality trait	0.396	0.387	0.5688				
Thinking mode	0.369	0.31	0.42	0.5763			

	educational environment	**social impact**	**personality trait**	**Thinking mode**	**student motivation**	**Moral self-regulation**	**academic integrity**
student motivation	0.377	0.315	0.369	0.408	0.5642		
Moral self-regulation	0.354	0.367	0.349	0.376	0.418	0.5748	
academic integrity	0.381	0.37	0.401	0.369	0.386	0.397	0.5953
AVE square root	0.76518	0.72904	0.754188	0.759144	0.751132	0.758156	0.771557

Table 4.13. (*Continued*)

8. Intermediary relationship

Moral self-regulation played a mediating role in the structural equation of this questionnaire. A total of five mediating effect paths were formed, of which they were educational environment to moral self-regulation to academic integrity, social impact to moral self-regulation to academic integrity ,personality traits to moral self-regulation to academic integrity ,thinking mode to moral self-regulation to academic integrity ,student motivation to moral self-regulation to academic integrity. In the structural equation, the direct effects of educational environment, social impact, personality traits, thinking mode, and student motivation on moral self-regulation and moral self-regulation to academic integrity were significant. And the indirect and total effects of the five mediating paths are significant. It indicates that the five mediating paths play a partial mediating role in the structural equation.

Table 4.14. Intermediation effects.

effect	**trails**	**Standard Efficacy values**	**Standard Error**	**p**	**Bias-Corrected95%CI**	
					lower	**upper**
direct effect	educational environment -->Moral self-regulation	0.12	0.043	0.007	0.037	0.206
	social impact -->Moral self-regulation	0.175	0.042	0.002	0.088	0.262
	personality trait -->Moral self-regulation	0.094	0.044	0.043	0.002	0.177
	Thinking mode -->Moral self-regulation	0.151	0.041	0.002	0.073	0.236
	student motivation -->Moral self-regulation	0.227	0.043	0.002	0.136	0.307
	Moral self-regulation -->academic integrity	0.412	0.037	0.002	0.337	0.48
indirect effect	educational environment -->Moral self-regulation -->academic integrity	0.049	0.019	0.007	0.014	0.086
	social impact -->Moral self-regulation -->academic integrity	0.072	0.019	0.002	0.035	0.114
	personality trait -->Moral self-regulation -->academic integrity	0.039	0.019	0.032	0.003	0.08
	Thinking mode -->Moral self-regulation -->academic integrity	0.062	0.018	0.002	0.031	0.1
	student motivation -->Moral self-regulation -->academic integrity	0.094	0.02	0.001	0.054	0.137

effect	trails	Standard Efficacy values	Standard Error	p	Bias-Corrected95%CI	
					lower	upper
total effect	educational environment -->Moral self-regulation -->academic integrity	0.049	0.019	0.007	0.014	0.086
	social impact -->Moral self-regulation -->academic integrity	0.072	0.019	0.002	0.035	0.114
	personality trait -->Moral self-regulation -->academic integrity	0.039	0.019	0.032	0.003	0.08
	Thinking mode -->Moral self-regulation -->academic integrity	0.062	0.018	0.002	0.031	0.1
	student motivation -->Moral self-regulation -->academic integrity	0.094	0.02	0.001	0.054	0.137

Table 4.14. (*Continued*)

9. Regulatory role

As shown by the moderating effect **Table 4.15**. Moderating effect is the effect of gender, age, grade on moral self-regulation on academic integrity. Where the moderating variables are gender, age and grade level variables. The result shows that its interaction term non-standardised coefficient is 0.093 which is not significant. r-square amount of change is not significant. Therefore, it indicates that the moderating effect of gender, age, and grade on moral self-regulation and on academic integrity is not valid. That is, hypothesis H7 is not valid.

Table 4.15. Regulatory effects.

	academic integrity		academic integrity	
(Constant)	-0.114	-1.059	-0.123	-1.146
Moral self-regulation	0.379***	10.035	0.375***	9.921
moderator variable	0.06	1.101	0.066	1.195
interaction term			0.093	1.314
R-square	0.137***		0.14	
F	50.838***		34.506***	

10. Hypothesis testing and analysis

From the hypothesis testing table in 4.16, we can see that the influence of educational environment, social impact, personality traits, thinking mode, students' motivation on moral self-regulation and moral self-regulation on academic integrity are positive and significant in each path. It shows that each factor has a significant positive effect on moral self-regulation. With the increase of the factors, the stronger moral self-regulation moral and thus have a significant effect on the level of academic integrity.

Table 4.16. Hypothesis testing.

Hypothesis	trails	Standardised coefficient	standard error	significance	conclusion
H1	Moral self-regulation<---educational environment	0.12	0.06	0.005	established
H2	Moral self-regulation<---social impact	0.175	0.062	***	established

Hypothesis	trails	Standardised coefficient	standard error	significance	conclusion
H3	Moral self-regulation<---personality trait	0.094	0.059	0.03	established
H4	Moral self-regulation<---Thinking mode	0.151	0.061	***	established
H5	Moral self-regulation<---student motivation	0.227	0.059	***	established
H6	academic integrity<---Moral self-regulation	0.412	0.04	***	established

Table 4.16. (*Continued*)

11. Conclusion

The purpose of this study is to investigate the relationship between educational environment, teacher peers, personality traits, thinking patterns, student motivation and moral self-regulation and academic integrity, and the following core conclusions were drawn from the data analysis:

The results of the study show that the five factors, namely, educational environment, teacher peers, personality traits, thinking patterns, and student motivation, have a significant positive influence on moral self-regulation, and the significance level of each influence pathway all meet the statistical requirements. This indicates that when the educational environment is better, the positive influence of teachers and peers is stronger, individuals have more appropriate personality traits, form positive thinking patterns, and have higher student motivation, the individual's moral self-regulation ability will increase.

Further analyses revealed that moral self-regulation also has a significant positive effect on academic integrity. That is, as the individual's moral self-regulation ability increases, his or her academic integrity level will be significantly improved.

Taken together, the educational environment, teacher peers, personality traits, thinking patterns, and student motivation indirectly have a positive effect on academic integrity by positively influencing moral self-regulation ability. This chain of influence mechanism reveals a potential path to enhance academic integrity: improving the educational environment, optimising teacher-student-peer relationships, cultivating positive personality traits and mindsets, and stimulating students' intrinsic motivation can enhance individuals' moral self-regulation ability, which in turn promotes the overall enhancement of academic integrity.

The conclusions of this study provide a theoretical basis and practical direction for improving academic integrity, based on which targeted interventions can be carried out to further verify the actual impact of each factor. This study not only provides scientific evidence for academic integrity development in Anhui's higher education institutions, but also addresses common challenges in global higher education ethics governance through theoretical frameworks, methodologies, and practical applications. Future efforts should focus on breaking disciplinary barriers by integrating pedagogy, psychology, ethics, and data science to build a more resilient academic integrity ecosystem. As Socrates famously said, "An unexamined life is not worth living," and academic pursuits require moral self-reflection to attain true wisdom. Ultimately, effectively resolving current integrity issues among college students is not an overnight achievement—it demands sustained, systematic efforts through collaborative participation from society, universities, families, and students themselves.

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4.2025 Hefei Technology College Horizontal Project "Innovative Development Approaches of Financial Services under Uncertain Trade Policies" (2025HXKT024)

Conflict of interest

The authors declare no conflict of interest.

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