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The influence of academic management and lecturer-student relationship on achievement motivation among students in a Chinese university

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ABSTRACT

China holds a unique position because it has consistently placed a high value on education, with higher education being considered the forefront of education. China's gross enrolment rate in higher education hit 51.6% in 2019, marking the country's entry into the popularization stage. In order to further investigate the influence of academic management (AM1) and lecturer-student relationship (LSR) on students' achievement motivation (AM2) within Chinese higher education that has entered the stage of popularization of higher education, the researcher chose the second-year students of Huanghe Jiaotong University, which is located in the central region of China, as the research object. The researcher used the positivist paradigm, the quantitative research design, and the survey method to carry out a further study through the 388 valid questionnaires that were returned. The study revealed a significant difference between students' AM2 and LSR. There is a significant correlation between AM1, LSR, and AM2, with LSR having a more significant influence on AM2. The results of the study provide empirical research data on how to develop LSR in modern times, and provide a basis for adopting reasonable and scientific ways and methods for AM1, as well as new requirements. These can help improve the quality of talent cultivation in Chinese universities and even foreign universities by encouraging students to pursue goals and achieve them.

Contribution/Originality: This article takes a point-by-point approach to investigate the effects of AM1 and LSR on AM2 in Chinese colleges and universities. It forms a preliminary research result that provides a specific reference, thereby stimulating students' AM2 and improving the quality of talent cultivation.

1. INTRODUCTION

As of the end of 2022, China boasted 3,013 higher education institutions, 46.55 million students enrolled in various forms of higher education—a 2.25 million increase from the year before—and a gross enrolment rate of 59.6%—a rise of 1.8 percentage points from the year before (Ministry of Education of the People's Republic of China, 2023). China's higher education development faces new problems and challenges, as well as new opportunities. China's policy and guidelines for attaching importance to education remain unchanged, accelerate the construction of a strong educational state, and provide education to the satisfaction of the people (Yao, 2023).

As Chinese higher education enters the stage of popularization, it is also facing great pressure in talent cultivation, while there are some real problems that need to be solved urgently. Specifically, Chinese colleges and universities are also facing new situations in the implementation of AM1, the construction of LSR, and the stimulation and maintenance of students' AM2.

Huanghe Jiaotong University was established in 1995 and has gone through the stages of operating a technical secondary school, junior college, and undergraduate university. Huanghe Jiaotong University welcomes students from all over the world, including both rural and urban areas, as well as those promoted from ordinary high schools and vocational high schools. While their scores may be similar, their levels are uneven and highly representative. From the work and research in recent years, the students of Huanghe Jiaotong University have a problem with AM2 (Tang, 2019).

There are many studies showing that AM1 influences AM2 (Dahlqvist, 2023; Seli, 2019). For example, guiding students to self-regulation through AM1 can stimulate AM2 and enable students to strive for success (Seli, 2019). A study investigated the relationship and found that there is a significant positive correlation between AM1 and academic engagement and students' AM2 (Cheng, Peng, & Chen, 2022). A study shows that academic behavioral management can impact students' AM2. Xu (2024) suggests that teacher and parent involvement in homework has positive implications and can influence students' motivation to complete homework and the quality of homework completed by managing students' homework completion behaviors with different levels of involvement. Academic emotional management can influence AM2, according to some studies. According to Dahlqvist (2023) emotions such as pleasantness resulting from academic emotional management are closely related to high and low quality of motivation and have an impact on motivation. Academic cognitive management has the potential to influence AM2. Students encounter AM2 in their daily lives, and research suggests that positive cognitive or academic cognition can predict positive activation of AM2 (Grund, Galla, & Fries, 2022). Despite the existence of relevant studies, how and to what extent AM1 affects AM2 quantitatively. At the same time, there is no existing research that directly addresses how AM1 affects AM2 among students in China especially at Huanghe Jiaotong University.

Many studies focus on the influence of LSR on students' AM2, which suggests that the relationship between lecturers and students has an influence on motivation (Lazarides & Schiefele, 2024; Liu, Gong, Zhang, Yu, & Zhou, 2021; Yunus, Osman, & Ishak, 2011). For instance, the relationship between teachers and students runs through the whole process of student learning, and a positive teacher-student relationship can stimulate students' AM2 and lead to better academic performance (Yunus et al., 2011). Lecturer support can go a long way in promoting motivation to learn and achievement while influencing student creativity (Liu et al., 2021). Numerous studies have focused on investigating how the intimacy of the teacher-student relationship affects student AM2. Teacher motivation is critical to student achievement, and teacher-student relationships and emotional intimacy can positively influence student interest and motivation (Lazarides & Schiefele, 2024). The research indicates that the interaction between lecturers and students in colleges and universities influences students' AM2, their development, and the quality of talent training. The problem is how and to what extent the LSR affects AM2 quantitatively among students in China, especially at Huanghe Jiaotong University, which is scarce in existing research and still deserves further study.

Comprehensively, from the above sorting and analyses, it can be seen that there are obvious problems among AM2 of students at Huanghe Jiaotong University, while AM1, LSR all have an influence on AM2. At the same time, existing research points out that there are urgent problems in the AM1, teacher-student relationship in colleges and universities (Chen, Zhou, Yue, & Lu, 2020; Wang & Yi, 2021). For example, problems such as the unavailability of academic cognition and inappropriate academic behaviors shown by unchecked explicit truancy and implicit truancy are prevalent in the AM1 of higher education (Chen et al., 2020). Students' achievement drive manifests both an aimless and utilitarian propensity at the same time. According to some academics, Chinese university students have a moderate level of accomplishment drive, exhibiting volatility, diversity, difference, and utility (Wang & Yi, 2021).

Based on the problems with student AM2 in higher education itself, and the fact that there are also clear problems with its influencing factors such as AM1 and teacher-student relationships, one of the major issues is how to stimulate the students' AM2. This study investigates the variations in AM1, LSR, and AM2 among students

based on gender and faculty, scrutinizes the connections between AM1, LSR, and AM2, and delves into the impact of AM1, LSR, and AM2 on students at Huanghe Jiaotong University. According to realize the objectives, this research intends to address the following research questions:

a) Is there any difference in AM1 among students?

b) Is there any difference in LSR among students?

c) Is there any difference in AM2 among students?

d) Is there any relationship between AM1 and LSR among students?

e) Is there any relationship between AM1 and AM2 among students?

f) Is there any relationship between LSR and AM2 among students?

g) What is the dominant factor affecting student AM2: AM1, or LSR?

2. LITERATURE REVIEW

2.1. AM1

Colleges and universities commonly use AM1, but we still need to examine its conceptual definition. The literature on AM1 is somewhat thin. The literature on AM1, including academic behavior management and academic objective management, is compiled in this study. For academic behavior management, lecturers need to be proficient in a variety of techniques in order to handle the hard conduct of their students (Sobeck & Reister, 2020).

It is important to pay attention to the classification of goals or academic objectives, as well as the elements that influence them. Goal selection, goal modification, goal formulation, goal monitoring, goal achievement, and goal delegation are just a few of the individual procedures that make up goal management, also known as objective management (Kondrakunta, Gogineni, & Cox, 2021). While it is feasible to create objectives, assign responsibilities, and select suitable management techniques and procedures, all of this could be useless if people selection is not given adequate consideration (Pavlov & Yahontova, 2020).

So as to behavior and objectives, strengthening classroom management is an important content. Teachers must constantly put forth effort and work long hours, boost motivation, fortify training, set up procedures, and raise investment in order to foster the classroom revolution both inside and externally (Liu, 2021). By evaluating the entire process—prevention, supervision, detection, admonition, and admonition—it creates an integrated management system for academic standards and scientific integrity (Zhang & Jiao, 2021).

2.2. LSR

The idea of LSR is covered in more detail, but the main ideas remain the same. According to some academics, the LSR is the reciprocal bond that develops between instructors and learners during the teaching and learning process. Of all the relationships that exist in colleges and universities, this one is the most fundamental (He, 2021). In universities, the most fundamental and unique interpersonal interaction is that between instructors and students (Zhou, Zhang, & Yan, 2021). The conventional lecturer's function is being replaced by one of assisting and promoting student learning. Better results emerge from student and lecturer collaboration and trust during the teaching and learning processes (Lewicka & Bollampally, 2022).

The theme labels of research on student-teacher relationships include "equal dialogue", "life-oriented", "harmony", "teachers and students with a shared future", "partners", "utilitarianism", "differentiation", and "game". For students, "equality" is the essential component of the perfect teacher-student connection, and for tutors, it is the central interpretation of the ideal partnership (Ma & Bie, 2021). Encourage open communication between instructors and students in order to build a rapport between them in higher education. Allow the dynamic between university professors and students to revert to the fundamentals of learning. Allow the dynamic between instructors and students at institutions to revert to the fundamentals of learning (Liu, 2019).

2.3. AM2

Motivation is the foundation for human agency and volitional activity. Despite the unique qualities and contributions of each theoretical model discussed in this special issue, four main dimensions unify them: individual variables, objectives, task values, and perceived rewards and costs (Hattie, Hodis, & Kang, 2020). Abdelrahman (2020) found significant correlations between the students' academic motivation, academic accomplishment and intrinsic motivation, and academic achievement and extrinsic motivation.

The role of AM2 in college management and student development cannot be underestimated. College students' psychological energy can be stimulated, and the quality of education provided in colleges and universities can be improved by applying the driving force of accomplishment motivation to the training of responsibility ability (Li, Guo, Qi, Xu, & Chen, 2020).

2.4. AM1 and LSR

A number of studies have focused on the relationship between AM1 and LSRs and their mutual influence. A strong lecturer-student rapport is essential to students' comprehensive and sustained growth. An undergraduate's self-esteem might rise in tandem with the lecturer-student dynamic. The interaction between a lecturer and a student has a significant impact on students' ability to fully exercise their right to an education, as well as whether or not colleges and universities are successful in developing creative genius (He, 2021). The interactions between lecturers and students significantly impact academic administration and staff development, according to Apeh and Dagwa (2020). In terms of the relationship between instructors and students, it will be highly beneficial if students believe that teachers can always put the needs and development of the student first, and that the teacher always looks out for the student's best interests.

According to a review of the literature, there is a dearth of studies, both in terms of number and quality, on how to create new kinds of relationships between lecturers and students now that higher education in China has reached the popularization stage. It is still important to carefully consider how to bring the idea of "teaching and learning mutually beneficial" from Chinese educational history to the popularization stage of China's higher education while still radiating a new age charm. Research on the comparability of AM1 and the LSR, as well as the distinct roles of instructors and students in academic administration, remains limited. Thus, it is still important to understand how instructors might contribute to AM1 research. Despite the widespread acknowledgement of the value of LSR, the research status of instructors and students in today's higher education still presents issues, such as inadequate study depth and inadequate outcomes (Karpouza & Emvalotis, 2019).

2.5. AM1 and AM2

Numerous research studies have examined the connection between AM1 and AM2. Some studies suggest that AM1 influences AM2, while others suggest that the latter influences the former or that the two influence each other (Aisy, 2023; Vu et al., 2022; Wen & Liu, 2022).

Students' AM2 correlates with the AM1 actions that educators and universities carry out. AM2 influences both the impact of academic administration and the quality of students' learning. Academic stress and motivation are the two main elements that affect academic achievement. Educational institutions and instructors implement AM1 strategies that connect to the academic motivation of students. The surrounding atmosphere and learning facilities have a significant and favorable indirect impact on pupils' performance. The primary way to achieve this effect is by influencing and igniting learning motivation (Aisy, 2023). The relationship between school psychologists and adolescents, as well as their guidance to adolescents, can help students achieve a certain level of value in their lives and thus become valued individuals (Zakaria et al., 2022).

AM1's effect on AM2 is also more pronounced. The outside world's incentives and demands will shift and have some impact on motivation (Vu et al., 2022). The social support and appropriate coping strategies provided by the

university through management can help to alleviate students' stress and enhance their psychological resilience for their growth, development, and future well-being (Rathakrishnan, Bikar Singh, & Yahaya, 2022).

The existing literature on the relationship between the two is not rich enough, mainly pointing out that AM2 affects AM1 and academic performance and that the latter impacts the former. Meanwhile, the former's influence remains controversial. After China entered the popularisation stage, the relevant research was very limited, especially at Huanghe Jiaotong University. There are few quantitative studies. The influence of AM1 on AM2 is still worth studying, and there is room.

2.6. LSR and AM2

Scholars have focused on the impact of teacher behavior on students' motivation for accomplishment in the teacher-student interaction. Teachers' guidance and the classroom environment significantly impact college students' academic performance. In order to encourage students' active learning motivation, college instructors should place a high value on classroom design (Lu, Zhao, & Xiang, 2021). Studies have demonstrated the significant relevance and contributions that the teaching model factor has made to independent research on the relationships between teachers and students. This study shows that children' academic success is significantly predicted by benign and good teacher-student relationships (He, 2021).

It is also worth studying how teacher-student relationships affect student AM2. Ensuring that there is an adequate and suitable connection between instructors and pupils is vital, followed by encouraging the growth of their friendly characteristics. The act of conducting a regularly scheduled or sporadic lecture class, seminar, and training is beneficial in achieving this goal (Uleanya, 2020). By catering to psychological needs, LSR may enhance enjoyment (Froiland, Worrell, & Oh, 2019). The support of lecturers has a direct impact on how motivated Chinese students are to achieve. Lecturers' encouragement is very significant to Chinese students. Compared to traditional teaching approaches, lecturers who use technology-integrated instruction are more likely to see an increase in students' intrinsic motivation and AM2 (Bikar et al., 2022).

The literature currently under publication includes a significant number of studies on the relationship between lecturers, students, and AM2. However, China has received relatively little attention from relevant studies since entering the stage of popularizing higher education. The scarcity of empirical studies on these topics necessitates extensive research. Furthermore, the literature currently in publication lacks pertinent empirical data, and the number and caliber of studies available are limited.

3. RESEARCH METHODOLOGY

3.1. Research Design

A research design should strive to precisely demonstrate how to incorporate quantitative aspects and content, as well as how to gather and analyze data beforehand (Davies, 2020). Quantitative research is utilized in this study in combination with its objectives.

The survey method will be used in this investigation. A survey is a required approach and a widely used, established research method. Through investigations and studies, scientists are able to provide fundamental data support for further research and analysis as well as assess and infer a variety of intangible aspects, such as concepts, knowledge, attitudes, and beliefs pertaining to subjective consciousness (Stantcheva, 2023).

This study mostly uses data collection and analysis to verify the hypothesis before presenting its own conclusions. According to the research, this study adopted a quantitative research design and collected data by survey.

3.2. Research Population and Sample

3.2.1 Research Population

Huanghe Jiaotong University is a general undergraduate institution of higher education in central China, covering a representative range of disciplines. Considering that second-year university students are already familiar with the university, are not yet in a hurry to look for a job, and are able to think and plan well about all aspects of university life, this study chose second-year university students of the university as the object of the study and as a whole to carry out the research. There are seven faculties in the university, and the total number of second year undergraduate students is 5004. 5004 is the overall data for this study.

3.2.2 Research Sample

Yamane, Krejcie, and Morgan's sample size calculations are appropriate for survey research (Uakarn, Chaokromthong, & Sintao, 2021). The V. Krejcie and Morgan table determines the sample size to be 357, with a 95% confidence level of t = 1.96. This study significantly increased the number of samples from 10% to 400 in order to ensure that the data that does not meet the requirements can be gathered, that the data collected can meet the requirements, and that the quality of the research can be guaranteed.

Table 1. Distribution of respondents by gender and faculty.

Faculty	Number of student	Theoretical number of respondent	Increasing 10%	Actual number of respondents		
				Total	Male	Female
FEM	1177	84	84×(1+10%)≈94	94	47	47
FAE	928	66	66×(1+10%)≈74	74	37	37
FMEE	765	55	55×(1+10%)≈60	60	30	30
FTE	721	51	51×(1+10%)≈58	58	29	29
FIE	656	47	47×(1+10%)≈52	52	26	26
FM	389	28	28×(1+10%)≈32	32	16	16
FAD	368	26	26×(1+10%)≈30	30	15	15
Total	5004	357	400	400	200	200

Note: Faculty of economics and management (FEM), Faculty of automotive engineering (FAE), Faculty of mechanical and electrical engineering (FMEE), Faculty of traffic engineering (FTE), Faculty of intelligent engineering (FIE), Faculty of marxism (FM), Faculty of art and design (FAD).

The study used cluster sampling first and then simple random sampling to ensure the representativeness of the sample. Table 1 shows the theoretical and final distribution of respondents by gender and faculty in Huanghe Jiaotong University. According to the established research design and arrangement, this study distributed 400 electronic questionnaires to ordinary undergraduate students and recovered 400 electronic questionnaires, of which 388 were valid, the questionnaire recovery rate was 100%, and the questionnaire efficiency was 97%.

After collecting the sample data, this study mainly used independent sample T-tests, analysis of variance (ANOVA), correlation analysis and regression analysis to process the data.

3.3. Research Instruments

The research instrument includes an academic management questionnaire (AM1 questionnaire), a lecturer - student relationship questionnaire (LSR questionnaire), and an achievement motivation questionnaire (AM2 questionnaire).

3.3.1. AM1 Questionnaire

Pintrich and De Groot (1990) created the Motivated Strategies for Learning Questionnaire (MSLQ), incorporating items from other scales measuring student motivation, use of cognitive strategies, and metacognition. This study also provides valuable insights into the Learning Needs Questionnaire (LNQ) and the Institutional

Support Questionnaire (ISQ). LNQ is used to measure students'perceived need to learn, ISQ is a supplement to LNQ, and is used primarily to assess students' psychological perceptions of school.

As per the research goals, the primary focus of this study was to examine the extent to which academic behavior management and academic objective management were implemented, as well as their influence on students' AM2 from the student's point of view. Two objects were ready for thorough level testing at the same time. Therefore, the AM1 questionnaire includes 8 items.

3.3.2. LSR Questionnaire

A survey tool that can gauge communication between lecturers and students is the Lecturer-Student Interaction Questionnaire (LSIQ). The LSR Questionnaire of Chinese Private Universities (LRQCPU) comprises 29 items, categorised into six categories: trust, closeness, caring, identity, and comfort. The questionnaire assesses the relationship between lecturers and students.

The dimensions or items in the questionnaires that researchers have collected and used are very important to this study, and they can be helpful. The primary focus of this study was to examine the effects of four different types of relationships between lecturers and students: authoritarian, democratic, inclusive, and dependent. Three items were ready for thorough level testing in the interim. The lecturer-student connection questionnaire affects 15 curricula.

3.3.3. AM2 Questionnaire

One important guideline in the accomplishment motivation measure is the Patterns of Adaptive Learning Scale (PALS). The creation of the original PALS measures took place in the early 1990s. The Patterns of Adaptive Learning Scales (PALS) tests are one of the best ways to get students motivated right now. They are very valid and reliable indicators of students' performance-avoidance, performance-approach, and personal mastery goal orientations (Midgley et al., 2013).

The study made use of the personal achievement goal orientation, which includes the performance-avoidance, performance-approach, and mastery goal orientation components. In this study, the AM2 questionnaire yields 14 items.

3.4. Validity and Reliability Tests

Reliability and validity are important indicators for analyzing whether the tools are usable or not. Previously, in the pilot study, the researcher analyzed the reliability and validity of the instrument used in this study, and the results of the analysis showed that the research instrument was usable. After the end of formal sampling, the researcher further analyzed the valid questionnaire data obtained, and the results of the analysis are as follows:

Formal survey data reliability is analyzed in terms of overall reliability and sub-reliability, respectively. Table 2 shows the results of the reliability analysis of the formally sampled data. Therefore, the results of the analyses show that the reliability is up to the mark, which meets the research needs.

Table 2. The Cronbach's α of the questionnaire.

Questionnaire	Cronbach's α
AM1 questionnaire	0.839
LSR questionnaire	0.735
AM2 questionnaire	0.806
Overall	0.806

The researcher conducted a sub validity analysis on the validity of the formal survey data. Table 3 presents the results of the validity analysis of the formal sample data. The researcher conducted an exploratory factor analysis of

the research instrument in conjunction with the data from the previous pilot study. The exploratory factor analysis revealed the instrument's good structural validity. Combined with other validity analysis techniques, the results of the analyses show that the validity is up to the mark, which satisfies research requirements.

Table 3. The KMO and Bartlett effectiveness of the questionnaire.

Questionnaire	KMO	Bartlett effectiveness
AM1 questionnaire	0.864	<0.001
LSR questionnaire	0.847	0.000
AM2 questionnaire	0.879	0.000

Note: Kaiser-Meyer-Olkin (KMO).

4. RESULTS AND DISCUSSION

4.1. Demographic Characteristics of the Respondents

Table 4 displays the gender and faculty distribution of the students included in this valid questionnaire. Specifically, there are 7 faculties involved in the 388 valid questionnaires, and the total number of students is 92, 68, 60, 54, 52, 32, and 30, respectively. All faculties have achieved the target of having 50% of male and female students in each of the 388 valid questionnaires. Inspection revealed that all questionnaires came from second-year students. Therefore, in conjunction with the sampling arrangement, the number and distribution of valid questionnaires obtained from this questionnaire survey meet the research requirements.

Table 4. Distribution of respondents by gender and faculty.

Gender	Program	Faculty							Total
		FEM	FAE	FMEE	FTE	FIE	FM	FAD	
Male	Number	46	34	30	27	26	16	15	194
	Gender ratio	23.70%	17.50%	15.50%	13.90%	13.40%	8.20%	7.70%	100.00%
	Faculty ratio	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
	Gender total ratio	11.90%	8.80%	7.70%	7.00%	6.70%	4.10%	3.90%	50.00%
Female	Number	46	34	30	27	26	16	15	194
	Gender ratio	23.70%	17.50%	15.50%	13.90%	13.40%	8.20%	7.70%	100.00%
	Faculty ratio	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
	Gender total ratio	11.90%	8.80%	7.70%	7.00%	6.70%	4.10%	3.90%	50.00%
Total	Number	92	68	60	54	52	32	30	388
	Gender ratio	23.70%	17.50%	15.50%	13.90%	13.40%	8.20%	7.70%	100.00%
	Faculty ratio	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Gender total ratio	23.70%	17.50%	15.50%	13.90%	13.40%	8.20%	7.70%	100.00%

4.2. The Difference of AM1 among Students

This study examined the difference in AM1 among students in Huanghe Jiaotong University. The independent sample t-test was used to test whether there is a significant difference between the two groups of boys and girls. As shown in Table 5, T-test result is t=1.517, p=0.13. Because pp>0.05, it can be seen that there is no significant difference between male and female students in the level of AM1.

Table 5. The difference of AM1 between male and female (N=388).

Number of cases	Average	Variances	F	Sig	t	df	Sig(2-tailed)
194 (Male)	32.4227	Equal variances assume	0.091	0.763	1.517	386	0.13
194 (Female)	31.7113						

A one-way ANOVA was used to test whether there are significant differences among students in the seven faculties in terms of AM1. Table 6 demonstrates the results. From the results, it can be seen that there is no significant difference in the embodiment of the level of AM1 among students ($F=2.103$, $p>0.05$).

Table 6. The difference of AM1 among students of different faculties (N=388).

Groups	Quadratic sum	df	Mean square	F	Sig.
Between groups	265.482	6	44.247	2.103	0.052
Within groups	8014.776	381	21.036		
Total	8280.258	387	—		

The analysis of the above data shows that there are no obvious differences in AM1 between boys and girls and among different departments. Although research literature in this area is scarce, (Pavlov & Yahontova, 2020) study provides some support for this conclusion. The university's overall management plays a crucial role in this situation.

4.3. The Difference of LSR among Students

This study investigated differences in LSR among university students. Table 7 illustrates that the T-test result is $t = 3.269$, $p<0.01$, which shows that there is a significant difference between the male and female students.

Table 7. The difference of LSR between male and female (N=388).

Number of cases	Average	Variances	F	Sig	t	df	Sig(2-tailed)
194 (Male)	49.9175	Equal variances not assumed	4.844	0.028	3.269	378.34	0.001
194 (Female)	47.6082						

Table 8 demonstrates the results of the ANOVA ($F=2.184$, $p<0.05$) . From the results, it can be seen that there is significant difference of LSR among different faculty students.

Table 8. The difference of LSR among students of different faculties (N=388).

Groups	Quadratic sum	df	Mean square	F	Sig.
Between groups	638.514	6	106.419	2.184	0.044
Within groups	18561.672	381	48.718		
Total	19200.186	387	—		

The analysis shows that there is a significant difference in LSR between male and female students, as well as among students of different faculties. This situation in the current state of research is consistent with Karpouza and Emvalotis (2019) findings, which indicate that lecturer-student relationships are still worth studying. The university needs to address this gap and take the necessary steps to improve the overall level of teacher-student relationships.

4.4. The Difference of AM2 among Students

This study examined the difference of AM2 among students. As shown in Table 9, the T-test result is t=2.174, p<0.05, which shows that there is a significant difference between male and female students in AM2.

Table 9. The difference of AM2 between male and female (N=388).

Number of cases	Average	Variances	F	Sig	t	df	Sig(2-tailed)
194 (Male)	50.6443	Equal variances assume	0.183	0.669	2.174	386	0.03
194 (Female)	49.0876						

Table 10 indicates the result of the ANOVA is F=2.268, p<0.05. From the results, it can be seen that there is a significant difference in AM2 among students from different faculties.

Table 10. The difference of AM2 among students of different faculties (N=388).

Groups	Quadratic sum	df	Mean square	F	Sig
Between groups	670.479	6	111.746	2.268	0.037
Within groups	18768.552	381	49.261		
Total	19439.031	387	—		

According to the results of the T-test and ANOVA test, there is a significant difference in AM2 among the university students. Both male and female students, as well as those from different faculties, mirror this situation. The findings of this study are consistent with the university's overall situation. The results of this study are consistent with the need to further stimulate students' AM2 for better development and the future (Wang & Yi, 2021; Xue & Guo, 2022).

This type of test result, with its clear differences, demonstrates both the obvious similarities among college students and their distinct stage characteristics. The results of this study provide basic research and data support for Chinese colleges and universities to stimulate students' AM2 in a targeted way and motivate them to better devote themselves to their studies.

4.5. The Relationship between AM1 and LSR among Students

This study examined the relationship between AM1 and LSR among students in Huanghe Jiaotong University. The result is shown in Table 11. Table 11 shows that there is no significant correlation between AM1 and LSR (r = 0.04).. Table 11 also shows the correlation between AM1 and democratic relationships, which is a dimension of LSR. The result indicates that the democratic relationship is significantly positive with AM1 (r = 0.435**, p<0.01).

Table 11. The relationship between AM1 and LSR (N=388).

Variables	Pearson correlation	Sig(2-tailed)
AM1 and LSR	0.004	0.935
AM1 and democratic relationship	0.435**	<0.01

Note: **Significant at the 0.01 level.

The results of this study are generally consistent with current societal expectations of LSRs. Numerous scholars have also argued that good LSRs are beneficial for students because they improve their creativity and contribute to their academic performance (He, 2021; Li, 2022; Zhou et al., 2021). The results of this study need to be further refined as a significant positive correlation between AM1 and democratic LSR, which cannot be simply defined as a significant positive correlation between LSR and AM1. The results of this study provide data to support the methods and paths of constructing a new type of good LSR. Therefore, in the process of AM1, it is essential that the universities and colleges pay attention to the construction of a new type of democratic LSR and then stimulate the endogenous motivation of students.

4.6. The Relationship between AM1 and AM2 among Students

As Table 12 shows, the correlation result is r=0.159**, p<0.01, and the relationship between AM1 and AM2 is positive. The results of this study are consistent with the actual situation in current universities. AM2 is generally considered to be correlated with AM1 and academic achievement, and in particular, it is believed that AM2 affects the effectiveness of AM1 and academic performance. The findings of this study show a positive correlation between AM1 and AM2. Meanwhile, the results of this study are also supported and backed up by the findings of some scholars, which are consistent with the findings of many scholars (Abdelrahman, 2020; Aisy, 2023; Vu et al., 2022; Wen & Liu, 2022).

Table 12. The relationship between AM1 and AM2 (N=388).

Variables	Pearson correlation	Sig(2-tailed)
AM1 and AM2	0.159**	0.002

Note: **Significant at the 0.01 level.

4.7. The Relationship between LSR and AM2 among Students

This study examined the relationship between LSR and AM2 among students at the university, and the result is shown in Table 13 (r=0.253**, P<0.01). Table 13 shows that there is a positive correlation between LSR and AM2. This finding is consistent with the findings of a considerable number of scholars (Hajovsky, Chesnut, & Jensen, 2020; Liu et al., 2021; Locke & Schattke, 2019; Uleanya, 2020; Wang & Yi, 2021). The specific student education and management style of the university, along with its general social environment, closely influence the findings of this study.

Table 13. The relationship between LSR and AM2 (N=388).

Variables	Pearson correlation	Sig(2-tailed)
LSR and AM2	0.253**	0

Note: **Significant at the 0.01 level.

4.8. The Influence of AM1, LSR on AM2 among Students

This study explored the influence of AM1 and LSR on AM2 among students in Huanghe Jiaotong University. Multiple linear regression analyses were used to test which of the two independent variables had a greater impact on student AM2. Table 14 demonstrates the results of the multiple linear regression analysis. The regression analysis data shows that the regression coefficient of AM1 is 0.158 (p<0.01), while that of LSR is 0.252 (p<0.01). The results show that AM1 and LSR are close to each other in terms of their influence on students' AM2, but relatively speaking, LSR has a little more influence.

Table 14. The influence of AM1, LSR on AM2 (N=388).

Model		Unstandardized coefficients		Standardization coefficient	t	Sig.
		B	Standard error	Beta		
1	(Constant)	29.72	3.388	—	8.771	0
	AM1	0.242	0.075	0.158	3.251	0.001
	Lecturer-student relationship	0.254	0.049	0.252	5.185	0

Note: Dependent variable: AM2.

5. SUGGESTIONS AND IMPLICATIONS

The data and literature analyses provided in this study can provide some guidance and help in the management of education and teaching in Huanghe Jiaotong University as well as other universities.

Universities need to give sufficient attention to the realistic conclusion that while there are no significant differences in AM1 between male and female students, or between students from different faculties, there are significant differences in LSR and AM2. Universities should first face up to this situation, analyse the reasons for it, and then adopt targeted measures and policies.

In response to the research findings indicating a lack of significant positive correlation between AM1 and LSR, but a significant positive correlation with a democratic type of relationship, the university should prioritize efforts to enhance the charisma and influence of AM1 lecturers. Simultaneously, they should focus on the development of a new type of lecturer by enhancing their training and cultivation, enabling them to adopt a more scientific approach to education and teaching.

The study's findings show that both AM1 and LSR significantly affect students' AM2, with LSR's effect being somewhat greater. However, the data analysis reveals that the impact of LSR on students' AM2 falls short of societal expectations. Therefore, Huanghe Jiaotong University should continue to strengthen the management of lecturers, improve the educational and teaching level through various ways, guide lecturers to be more actively involved in teaching, and gradually increase the degree of positive influence on students, so as to scientifically and reasonably improve the level of students' AM2.

By analyzing the results and discussions of this study, the researcher suggests that Chinese universities, especially Huanghe Jiaotong University, should continue to increase the research on students' AM1, further increase its scientific nature, guide students to participate actively and develop positively, pay attention to the changes in the current LSR in colleges and universities, and guide the lecturers to adapt to the new situation, make a good transformation, establish a democratic type of relationship with the students, and inspire the students to make their own decision. Simultaneously, there is a need to decrease external intervention and evaluation of students' achievements, promote self-achievement among students, reduce the utilitarian and controlled nature of AM2, and enhance the quality of talent training.

6. CONCLUSION

This study, guided by existing theories and quantitative research, has concluded that there is no significant difference between male and female students at Huanghe Jiaotong University. However, among students from different colleges, there is a significant difference in LSR and AM2. Additionally, there is no significant correlation between AM1 and LSR, but there is a significant positive correlation with AM2, and a significant positive correlation between LSR and AM2. Meanwhile, the LSR also exerts a more significant influence on AM2.

Due to the limitations of the sample selection and research methodology, the findings of this study may also require further research. The researcher is still trying to get objective results that reflect reality well.

Based on this conclusion, this study argues that Chinese higher education still faces outstanding problems after entering the popularization stage, especially how to improve the quality of talent cultivation by stimulating students' AM2. Therefore, it is still worth studying how to build a decent LSR, establish a scientific and reasonable AM1 system, and then guide and stimulate college students' AM2.

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Transparency: The authors declare that the manuscript is honest, truthful and transparent, that no important aspects of the study have been omitted and that all deviations from the planned study have been made clear. This study followed all rules of writing ethics.
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APPENDIX

The Influence of Academic Management and Lecturer-student Relationship on Achievement Motivation Questionnaire

Dear students:

Thank you for consenting to answer this survey. The purpose of this survey is to learn about students' basic understanding and attitudes towards academic management, lecturer-student relationship and achievement motivation, as well as their interrelationship and influences. This questionnaire contains four parts with a total of 41 items, which are required to answer. There is no right or wrong of the answers, and it does not have any impacts on your evaluation. You only need to answer the questions according to your own ideas, thoughts and opinions. Your answers will be kept confidential, and the data of the survey are only used for study. Your reply for the questions is of great importance to our research. Thank you for your support!

DIRECTION: Please read every sentence carefully, choose the description of the sentence according to your idea or opinion, and the tick a circle around the figure. The greater figure is, the more agree with the description:

1=Strongly Disagree, 2=Weakly Disagree, 3=Uncertain,4=Weakly Agree, 5=Strongly Agree.

Here is an example.

You clearly know the university's requirements for the students on academic behavior.

1 2 3 4 (5)

PART A (Infotmation for Respondents' Demographic)

A1. Your gender is____. (A) Male (B) Female

A2. Your age is____.

A3. Your academic year of the study is____.

A4. Your faculty is_____(faculty).

(A) Faculty of Economics and Management (B) Faculty of Automotive Engineering
(C) Faculty of Mechanical and Electrical Engineering (D) Faculty of Traffic Engineering
(E)Faculty of Intelligent Engineering (F) Faculty of Marxism
(G)Faculty of Art and Design

PART B (The academic management questionnaire)

Instructions: Please read every sentence carefully, choose the description of the sentence according to your idea or opinion, and the tick a circle around the figure. The greater figure is, the more agree with the description:
1=Strongly disagree, 2=Weakly disagree, 3=Uncertain, 4=Weakly agree, 5=Strongly agree.

Items		Strongly disagree	Weakly disagree	Uncertain	Weakly agree	Strongly agree
B1	I clearly know the university's requirements for the students on academic behavior.	1	2	3	4	5
B2	I can strictly follow the requirements of the university's academic behavior management.	1	2	3	4	5
B3	The university has a strict management on the students' learning and academic behavior.	1	2	3	4	5
B4	I have a clear understanding of the targets and requirements for academic management and graduation.	1	2	3	4	5
B5	I can manage yourself according to your academic requirements and graduation objectives.	1	2	3	4	5
B6	The university often educates the students about the objectives of academic management.	1	2	3	4	5
B7	I think that academic management mainly depends on the strict requirements of the university.	1	2	3	4	5
B8	In my opinion, the objectives and effects of academic management mainly depend on the efforts of the students themselves.	1	2	3	4	5

PART C (The lecturer-student relationship questionnaire)

Instructions: Please read every sentence carefully, choose the description of the sentence according to your idea or opinion, and the tick a circle around the figure. The greater figure is, the more agree with the description:
1=Strongly disagree, 2=Weakly disagree, 3=Uncertain, 4=Weakly agree, 5=Strongly agree.

Items		Strongly disagree	Weakly disagree	Uncertain	Weakly agree	Strongly agree
C1	I think the relationship with my lecturer has a great influence on me.	1	2	3	4	5
C2	I think my lecturers can treat students equally and get along well with us.	1	2	3	4	5
C3	I think that lecturers who treat students equally have a greater positive impact on students.	1	2	3	4	5
C4	I am mostly willing to get along with the lecturers who treat students equally.	1	2	3	4	5
C5	I think my lecturer is usually more arbitrary and rarely discusses things with students.	1	2	3	4	5
C6	I think lecturers who are arbitrary and like to make decisions for students in advance have a greater positive influence on students.	1	2	3	4	5
C7	I am mostly willing to get along with the lecturers who often make decisions for you.	1	2	3	4	5
C8	I think my lecturer doesn't care about the students' study and life.	1	2	3	4	5
C9	I think lecturers who allow students indulging in themselves have a greater	1	2	3	4	5

	positive impact on students.					
C10	I am most likely to get along with the lecturers who allow students indulging in themselves.	1	2	3	4	5
C11	I think my lecturer likes students to become dependent on them.	1	2	3	4	5
C12	I think the lecturers whom the students can rely on have more positive influence on students.	1	2	3	4	5
C13	I am most likely to get along with the lecturers who like to make students rely on.	1	2	3	4	5
C14	In my opinion, lecturers are the most important in the process of establishing a lecturer-student relationship..	1	2	3	4	5
C15	I think students play an important role in building the relationship between lecturers and students.	1	2	3	4	5

PART D (The achievement motivation questionnaire)

Instructions: Please read every sentence carefully, choose the description of the sentence according to your idea or opinion, and the tick a circle around the figure. The greater figure is, the more agree with the description:

1=Strongly disagree, 2=Weakly disagree, 3=Uncertain, 4=Weakly agree, 5=Strongly agree.

Items		Strongly disagree	Weakly disagree	Uncertain	Weakly agree	Strongly agree
D1	I've learned a lot of new knowledge in this university, which is really important to me.	1	2	3	4	5
D2	One of my goals in this university is to learn as much as I possible.	1	2	3	4	5
D3	One of my goals is to master a lot of new skills in this university.	1	2	3	4	5
D4	For me, it is important to understand my university study thoroughly.	1	2	3	4	5
D5	It is important to me that I improve my skills this year.	1	2	3	4	5
D6	It is important to me that other students in my class think I am good at my university study.	1	2	3	4	5
D7	One of my goals is to show others that I am good at my university study.	1	2	3	4	5
D8	One of my goals is to show others that university study is easy for me.	1	2	3	4	5
D9	One of my goals is to look smarter compared to the other students in my class.	1	2	3	4	5
D10	Compared to others in my class, it is important to me that I look smarter in study.	1	2	3	4	5
D11	It is important to me that I don't look stupid in my class.	1	2	3	4	5
D12	One of my goals is to keep others from thinking that I'm not smart in university study.	1	2	3	4	5
D13	It is important to me that my lecturer doesn't think that I know less than others in university study.	1	2	3	4	5
D14	One of my goals in class is to avoid troubles in my university study.	1	2	3	4	5