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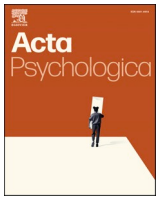

A psychological perspective on entrepreneurship and innovation in universities: The role of educators and tutors in enhancing motivation, interest, and academic success

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ABSTRACT

A psychological perspective on entrepreneurship and innovation in universities underscores the significant role of educators and tutors in enhancing students' motivation, interest, and academic success. This study aims to assess the motivation, interest, and academic performance of students studying entrepreneurship in two distinct groups: one utilizing an innovative approach involving interaction with an educator and tutor from a real company, and the other employing a traditional teaching method. It enrolled 320 third-year students, who learned entrepreneurship in a Chinese university. The research tools were the Academic Motivation Scale (AMS) and the Interest in Entrepreneurship and Future Aspirations Questionnaire. The authors also considered the final annual grades in Entrepreneurship. Results highlighted the profound and multifaceted impact of the developed tutor-led approach in promoting increased motivation, interest, and performance in the intervention group. These results not only enrich the academic discourse on entrepreneurial education involving educators and tutors but also offer practical recommendations for instructors and educational institutions to enhance their pedagogical strategies. Future research prospects include exploring the complex dynamics of tutor interventions, their long-term impact, and addressing the limitations of current studies within the context of a psychological perspective on entrepreneurship and innovation in universities.

1. Introduction

Today, universities face the imperative of preparing students for successful professional futures in which entrepreneurial skills and innovative thinking are increasingly essential components of their competitiveness (Al-Khatib et al., 2021). However, one of the key challenges in contemporary entrepreneurship education is the gap between the theoretical knowledge acquired by students in universities and its practical application in real business environments (Ozdemir et al., 2019). Traditional teaching methods that rely solely on the transmission of knowledge from instructor to student may not sufficiently foster engagement and motivation, particularly in the absence of direct interaction with business professionals (Fischer et al., 2021). This situation creates a disconnect between academic entrepreneurship education and actual market conditions.

In response to this challenge, universities have begun to implement innovative approaches by involving mentors and industry experts in the educational process. Such initiatives entail more active participation of the business sector in education, establishing conditions for experiential learning and providing students with the opportunity to acquire valuable practical knowledge (Ha, 2022; Liu, 2023). The involvement of mentors enables students to observe the real-world application of entrepreneurial principles, thereby increasing their interest in the subject matter and fostering the development of entrepreneurial thinking. This is corroborated by studies emphasizing the importance of practice-oriented learning (Cascavilla et al., 2022; Hamburg, 2021; Liu, 2023).

Nevertheless, the question of how the presence of mentors precisely affects the motivation, interest, and academic performance of entrepreneurship students remains unresolved. Most existing research has concentrated on the structural aspects of educational programs, while psychological factors such as motivation and engagement have not been sufficiently examined (Li et al., 2023; Mudalige, 2023; Silva et al.,

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2024). The lack of empirical data regarding the influence of mentors on students' psychological states represents a gap in the academic literature that warrants further exploration (Chen & Ifenthaler, 2023; Patra et al., 2023; Postigo et al., 2020).

The present study aims to address this gap by conducting a comparative analysis of two educational approaches: an innovative model involving mentors and a classical model based exclusively on teacher-led instruction. The primary research questions include how the presence of a mentor influences students' perception of the subject, whether it enhances their motivation, facilitates a deeper understanding of entrepreneurial concepts, and stimulates the development of innovative thinking. Furthermore, the study examines the extent to which the absence of a mentor in the classical approach might diminish students' interest in entrepreneurship and restrict their ability to apply knowledge in practice.

The findings are expected not only to expand the academic understanding of the psychological aspects of entrepreneurship education but also to provide practical recommendations for universities regarding the integration of mentors into the educational process. In the long term, such integration may contribute to the creation of an innovative educational environment and a more effective preparation of students for entrepreneurial endeavors. Moreover, this study is novel in that it empirically demonstrates the impact of business mentors on the motivation, interest, and academic performance of Chinese students in the field of entrepreneurship. Unlike previous research that has focused on the structural aspects of educational programs, this article emphasizes the underlying psychological mechanisms.

1.1. Literature review

In recent years, China has demonstrated significant growth and transformation in the field of entrepreneurship education. Universities have incorporated entrepreneurship into their curricula, aiming to cultivate a culture of innovation and nurture a new generation of entrepreneurs (Cui et al., 2021). This process combines theoretical instruction with practical projects, mentorship, and immersion in real-world business scenarios; students are encouraged to develop business ideas and engage in business planning (Guerrero & Urbano, 2019; Mei & Symaco, 2022). However, despite the implementation of these methods, questions remain regarding the extent to which these approaches affect students' motivation, engagement, and academic success.

Psychological factors play a crucial role in the educational context, particularly in the field of entrepreneurship. Research indicates that students' motivation directly influences their academic performance and willingness to engage in the learning process (Li et al., 2023; Mudalige, 2023). In entrepreneurship education, motivation is especially critical, as students must be prepared to solve problems independently and overcome challenges (Frese & Gielnik, 2023). Moreover, student engagement is a significant predictor of academic success (Silva et al., 2024). When students exhibit interest in a subject, they tend to invest greater effort and demonstrate perseverance, leading to improved learning outcomes (Chen & Ifenthaler, 2023). One effective method for enhancing engagement is the use of active learning strategies, which include practical activities and interaction with mentors (Patra et al., 2023).

Within the context of entrepreneurship education, engagement is key, as it fosters the development of innovative thinking and creativity (Postigo et al., 2020). Nevertheless, traditional methods of teaching entrepreneurship are often confined to theoretical frameworks and classroom lectures, which do not always effectively connect academic learning with real-world business practices (Kremel & Wetter Edman, 2019). The modern educational environment demands a more practice-oriented approach that combines academic rigor with mentorship and professional guidance (Watson & McGowan, 2020). This has led to the emergence of innovative pedagogical methods that utilize virtual platforms, mentoring, tutoring, gamification, virtual simulations, strategic business modeling, blockchain technologies, digital collaborative tools, and networked learning (Charrouf & Taha Janan, 2019; He et al., 2019; Lv et al., 2021; Min & Bin, 2022; Xia, 2022). However, the question of the precise effect of integrating mentors on students' motivation, interest, and academic success remains open.

Recently, tutors have increasingly become involved in entrepreneurship education due to the growing recognition of the value of practical experience. Although traditional academic instruction holds undeniable significance, it often fails to provide students with a sufficient understanding of real-world business contexts (Holloway & Pimlott-Wilson, 2020). Tutors—who are experienced professionals or industry experts—bridge this gap by offering students valuable insights derived from practical experience. This enriches the educational process by providing students with perspectives that extend beyond theoretical concepts (Wang, 2020).

It is important to distinguish between a mentor and a tutor: in the context of entrepreneurship education, a tutor is an individual with a proven track record in business (Cascavilla et al., 2022). Such specialists possess experience in launching successful startups, working within corporate environments, and implementing innovative business solutions. They are capable of imparting up-to-date knowledge to students, sharing real challenges and successes, and offering solutions based on their own entrepreneurial journeys (Soto-Lillo & Quiroga-Lobos, 2021). Additionally, tutors can provide students with access to professional networks, thereby facilitating connections with potential employers, investors, and partners (Donoso-González et al., 2022; Xia, 2022).

Despite these evident advantages, the interaction between tutors and university faculty remains insufficiently explored, warranting further research (Du et al., 2021; Xia, 2022).

The development of students' motivation and interest in entrepreneurship education is of paramount importance, as engaged and motivated students are more inclined to actively participate in the learning process, develop their own business ideas, overcome challenges, and adapt to changing market conditions (Ryan & Deci, 2020). However, students' motivation can be undermined by outdated teaching methodologies, insufficient relevance of materials, high academic workloads, and a lack of real-world experience (Murnieks et al., 2020). The integration of tutors into the educational process has the potential to partially address these issues by creating additional synergy between instructors and students, as well as enhancing academic performance (Xia, 2022). Moreover, research indicates that innovation management in small and medium-sized enterprises, when coupled with active entrepreneurship, contributes to the resilience and competitive advantage of organizations (Mensah et al., 2024; Troise et al., 2024). This underscores the importance of entrepreneurial thinking and active participation in innovation processes for achieving sustainable development (Tajpour et al., 2024).

1.2. Problem statement

This research aimed to study the influence of pedagogical approaches on the motivation, interest, and academic success of students in the context of entrepreneurship and an innovative approach to education. In particular, it aimed to assess the motivation, interest, and academic achievement in the two groups: with an innovative approach involving the work of a teacher and a real company representative (tutor) or with traditional learning. The authors used empirical research and aimed to elucidate the effects of this approach on the development of motivation and interest versus the traditional method under the teacher's guidance only. They also investigated the academic success of students in Entrepreneurship in the form of final annual grades. The research tasks were as follows:

1. How does interaction with tutors influence students' motivation?
2. Does this interaction affect students' interest in entrepreneurship?
3. Does such a model enhance academic performance?

2. Materials and methods

In order to conduct the study, a revised and validated Chinese version of the Academic Motivation Scale (AMS) (Zhang et al., 2015) was utilized. This scale enabled the identification of various motivational profiles among students, which, in turn, can inform the development of educational strategies aimed at enhancing engagement, academic performance, and overall educational well-being. The AMS comprised 28 statements, with 4 items allocated to each of three subscales: external motivation, intrinsic motivation, and amotivation. Researchers employed a 7-point Likert scale for quantitative assessment. The possible score range for the amotivation subscale was from 4 to 28, while the scores for both external and intrinsic motivation varied from 12 to 84.

Furthermore, to align with the objectives of this study, a specialized instrument—the Interest in Entrepreneurship and Future Aspirations Questionnaire (see Appendix 1)—was developed. This questionnaire consisted of 20 statements grouped into two subscales: "interest in entrepreneurship" and "future entrepreneurial aspirations." A 7-point Likert scale was also used to gauge respondents' levels of agreement or disagreement with each statement.

In the initial phase, a panel of experts in entrepreneurship education and psychometrics conducted an expert evaluation of the questionnaire to ensure content validity and alignment with the constructs under investigation. This was followed by a pilot study involving 100 students, which assessed the clarity, relevance, and reliability of the items. The final phase involved the statistical analysis of the data, including factor analysis and reliability testing using Cronbach's alpha, which averaged 0.906 across the two subscales.

To assess students' academic performance at the end of the academic year and following the influence of the investigated factors, the authors analyzed their final grades in the entrepreneurship course. The grading system was categorized as follows: 90–100 points (excellent), 80–89 points (good), 70–79 points (satisfactory), 60–69 points (pass), and 0–59 points (fail). This approach allowed the researchers to obtain objective data on the level of students' academic achievements and their association with motivational aspects of learning.

2.1. Influence

Also, the researchers developed a learning program, which invited tutors should implement in the curriculum. This program was called Navigating Entrepreneurship with a Tutor. It aimed to use the real experience of tutors to equip aspiring student entrepreneurs with the practical knowledge and skills needed to start, grow, or work in successful businesses. This program aimed to bridge the gap between theory and practice, impart practical experience, and provide students with practical strategies to navigate the entrepreneurial environment. Furthermore, psychological aspects were incorporated into this program to foster the development of key skills in students (Table 1).

This six-month practical entrepreneurship program was led by experienced tutors and designed to provide students with invaluable practical knowledge about the world of entrepreneurship. Each month the focus was on practical knowledge and skills. The program combined interactive lectures, workshops, sessions, group discussions, and case studies to create an immersive and effective learning experience. Upon its completion, the students were equipped not only with the theoretical understanding but also with the practical tools and strategies needed to address the challenges and opportunities of entrepreneurship.

Table 1
Navigating entrepreneurship with a tutor, influence program for implementation in this research.

Month	Goals	Tutor-Led Activities	Psychological Aspects
1	Formation of entrepreneurial thinking	Acquaintance with entrepreneurial thinking through practical experience. Sharing personal entrepreneurial experiences and lessons. Group discussion of the key qualities and attitudes of successful entrepreneurs.	Development of self-efficacy and confidence through examples of successful entrepreneurs.
2	Identification and validation of business ideas	Tutor-led workshops on idea generation and validation. Students present and validate their business concepts. Group feedback and clarification of business ideas.	Stimulation of creative thinking and enhancement of intrinsic motivation through involvement in the idea-generation process.
3	Business model development and go-to-market strategy	Lectures on various business models. Students work on drawing up their business models. Tutor-led session on go-to-market strategies. Consideration of a successful startup on case studies.	Strengthening of critical thinking and analytical skills through the development and evaluation of business models.
4	Product development	Practical tutor advice on the development and creation processes. Practical lessons: creation and defense of projects. Case studies of innovative products.	Enhancement of resilience and problem-solving abilities through practical participation in product development.
5	Marketing, sales, and customer acquisition	Seminars on developing effective marketing and sales strategies. Analysis of real marketing campaigns in the Chinese market. Joint role-playing and presentations to potential clients.	Development of communication and social skills essential for successful negotiation and sales.
6	Scaling up and sustainable growth	Tutor's experience in scaling a startup. Group discussions on business scaling strategies. Examples of successful scaling and growth stories as well as dealing with challenges and obstacles along the way.	Cultivation of strategic thinking and adaptability through the study of real-life examples of successful business scaling.

2.2. Participants

In total, the research enrolled 320 third-year students, who learned Entrepreneurship in a Chinese university. They were randomized into influence and control groups (Table 2).

Table 2
Details of student participants.

Group	Total	Males	Females	Mean Age	SD
A (control)	160	84	76	21.35	1.13
B (influence)	160	88	72	21,87	1.24

All students were of the same year of entry and their native language was Chinese. No foreign students were enrolled. The participants volunteered to participate and were not coerced. The groups were divided into mini-groups (25 to 30 students in each) for each lesson to increase

the program's effectiveness and provide more personalized learning. The study involved 6 tutors, who were seasoned professionals with extensive business experience. They had various backgrounds, including successful startup founders, marketing and branding experts, product development experts, and finance and financing professionals. Their collective experience spanned multiple industries, thus enabling them to provide actionable insights into business model innovations, go-to-market strategies, marketing and sales tactics, and scaling techniques. Each of them specialized in a certain block of the developed program.

2.3. Research design

The study began at the end of January 2023. All participants completed two pre-tests using online forms. Then, they were randomized into the control and influence groups and attended lessons as part of their curriculum. The influence group had four additional one-hour classes a month under the guidance of one of the tutors who implemented the above-mentioned program. Thus, the influence group received 24 lessons in total from 6 tutors. As of June 2023, the influence was completed and then participants re-completed the AMS and the Interest in Entrepreneurship and Future Aspirations Questionnaire. In addition, the authors asked for the student's academic success from the university administration in the form of their final grades in Entrepreneurship.

2.4. Data analysis

The authors analyzed the self-reported results and academic success using SPSS with statistical methods. They also calculated the Wilcoxon test to determine the significance of intragroup differences.

2.5. Ethical issues

The research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The research was approved by the local ethics committees of [BLINDED] University (Protocol no. 4993 dated from 02/02/2022). All participants provided their voluntary consent and received guarantees of their confidentiality.

3. Results

The aim of this study was to examine the impact of the interaction between instructors and tutors on students' motivation, interest, and academic performance within the field of entrepreneurship education. The primary research questions were: How does interaction with tutors influence students' motivation? Does such interaction enhance their interest in entrepreneurship? And does it exert a positive effect on their academic performance? First of all, it should be defined whether the interaction between the teacher and the tutor influenced the students' motivation by comparing the control and influence groups in pre-tests and post-tests and to determine the significance of differences. Table 3 shows the scores of control and influence groups according to the Academic Motivation Scale (AMS).

To confirm the significance of intragroup differences, the authors used the Wilcoxon test (Table 4).

Thus, in the control group, the average scores for intrinsic and extrinsic motivation showed minimal changes: extrinsic motivation increased by only 0.05, intrinsic motivation by 1.27, and amotivation decreased by 0.22. These changes were not significant, confirming the absence of a substantial impact of the traditional teaching method on student motivation. In the experimental group, where an innovative approach involving tutors was employed, significant improvements were observed. Extrinsic motivation increased by 8.76 points, intrinsic motivation by 6.10 points, and amotivation decreased by 3.05 points. These results indicate a positive effect of tutor involvement on student motivation. Students who received mentorship and practical advice from tutors exhibited higher levels of intrinsic and extrinsic motivation, along with reduced feelings of futility and lack of interest in their studies.

The second research task was to define whether the interaction

Table 4
The significance of intragroup differences in the pre-tests and post-tests according to the Academic Motivation Scale in the control and influence groups.

	Extrinsic Motivation*	Intrinsic Motivation	Amotivation
Control Group			
Z	-.459[b]	-.397[c]	-.410[b]
P-value	0.698	0.234	0.364
Influence Group			
Z	−3.412[b]	−3.548[b]	−3.214[b]
P-value	0.000	0.000	0.000

* Note: b is based on negative ranks; c is based on positive ranks.

Table 3
The scores of control and influence groups according to the subscales of the Academic Motivation Scale (AMS).

		Extrinsic Motivation, Pre-Test	Extrinsic Motivation, Post-Test	Intrinsic Motivation, Pre-Test	Intrinsic Motivation, Post-Test	Amotivation, Pre-Test	Amotivation, Post-Test
Control Group	Mean	53.11	53.16	43.56	44.83	16.78	16.56
	Standard error of the mean	0.246	0.292	0.321	0.295	0.181	0.183
	Minimum	48	48	37	40	13	13
	Maximum	58	59	50	52	20	20
	Range	10	11	13	12	7	7
	Variance	9.655	13.604	16.537	13.877	5.266	5.355
	Kurtosis	−1.147	−1.338	−1.238	−1.274	−1.259	−1.292
	Skewness	0.049	0.129	−0.091	0.004	−0.079	−0.136
	Standard deviation	3.107	3.688	4.067	3.725	2.295	2.314
Influence Group	Mean	53.30	62.06	43.78	49.88	16.71	13.66
	Standard error of the mean	0.234	0.336	0.319	0.193	0.183	0.092
	Minimum	48	55	37	46	13	12
	Maximum	58	68	50	54	20	15
	Range	10	13	13	8	7	3
	Variance	8.765	18.109	16.298	5.942	5.363	1.359
	Kurtosis	−1.184	−1.176	−1.210	−1.184	−1.331	−1.438
	Skewness	−0.119	−0.280	−0.070	−0.003	0.048	−0.192
	Standard deviation	2.961	4.255	4.037	2.438	2.316	1.166

between the teacher and the tutor influenced the students' interest by comparing the control and influence groups in pre-tests and post-tests and to determine the significance of differences (Table 5).

In the control group, mean pre-tests and post-tests were 46.43 versus 46.54 (+0.11) for Interest in Entrepreneurship and 37.44 versus 38.98 (+1.54) for Future Entrepreneurial Aspirations. In the influence group, mean pre-tests and post-tests were 46.19 versus 51.18 (+5.99) for Interest in Entrepreneurship and 37.29 versus 43.37 (+6.08) for Future Entrepreneurial Aspirations. Table 6 shows the significance of intragroup differences.

The control group showed no intragroup differences, and the influence group showed a significant difference. In the experimental group, a significant increase in the level of engagement was observed. Specifically, the involvement of tutors sharing their real entrepreneurial stories and experiences contributed to a higher level of student interest in the subject matter. Additionally, the future entrepreneurial aspirations of students in this group also significantly improved, suggesting that students who received support and mentorship from tutors became more confident in their abilities and prospects for implementing entrepreneurial projects in the future.

The third research task was to define whether the interaction between the teacher and the tutor influenced the student's academic success by comparing the final grades of the control and influence groups (Table 7).

Intergroup comparison showed that the intervention group had a higher percentage of students with the grades of Excellent, Good, and Fair. The intervention group showed a notable increase in higher grades, incredibly Excellent and Good without any Failed. The percentage difference is particularly high for Excellent, where the result in the intervention group was 18.1 % higher. This indicates that the intervention had a positive effect on academic performance, thus increasing the proportion of high grades in Entrepreneurship.

Table 6
The significance of intragroup differences in the pre-tests and post-tests according to the Interest in Entrepreneurship and Future Aspirations Questionnaire in the control and influence groups.

	Interest in Entrepreneurship*	Future Entrepreneurial Aspirations
Control Group		
Z	-.579[b]	-.239[c]
P-value	0.354	0.187
Influence Group		
Z	−3.984[b]	−3.651[b]
P-value	0.000	0.000

* Note: b is based on negative ranks; c is based on positive ranks.

Table 7
Quantitative and percentage distribution in control and influence groups by academic success in Entrepreneurship.

		90 to 100 (Excellent)	80 to 89 (Good)	70 to 79 (Fair)	60 to 69 (Passed)	0 to 59 (Failed)
Control group	N	18	63	43	33	3
	%	11.3	39.4	26.9	20.6	1.9
Influence group	N	47	58	36	19	0
	%	29.4	36.3	22.5	11.9	0.0

4. Discussion

The results of the study demonstrate a significant improvement in academic motivation, engagement, and performance among students in the experimental group compared to the control group. The observed differences in levels of motivation, interest, and academic performance between the two groups can be attributed to several factors. For example, direct interaction between students and tutors with practical business experience enabled them to see real-life applications of the theories studied, which likely enhanced their engagement in the learning process (Guerrero & Urbano, 2019; Mei & Symaco, 2022). This is supported by previous research indicating the significant impact of practice-oriented learning on student outcomes (Cascavilla et al., 2022; Wang, 2020). Moreover, tutors not only provided theoretical knowledge but also shared their personal experiences in overcoming entrepreneurial challenges, which may have increased the students' intrinsic motivation (Frese & Gielnik, 2023). According to self-determination theory, intrinsic motivation is enhanced when learners perceive a direct connection between the material studied and their future career objectives (Ryan & Deci, 2020). Furthermore, the marked improvement in academic performance within the innovative group may be related to the fact that tutors did not merely transmit knowledge; they also actively engaged students in the learning process through discussions, business simulations, and analysis of real business cases (Donoso-González et al., 2022; Xia, 2022). This approach facilitates a deeper understanding of the material and its effective application in both examinations and practical activities (Holloway & Pimlott-Wilson, 2020). Moreover, the

Table 5
The scores of control and influence groups according to the subscales of the Interest in Entrepreneurship and Future Aspirations Questionnaire.

		Interest in Entrepreneurship, Pre-Test	Interest in Entrepreneurship, Post-Test	Future Entrepreneurial Aspirations, Pre-Test	Future Entrepreneurial Aspirations, Post-Test
Control Group	Mean	46.43	46.54	37.44	38.98
	Standard error of the mean	0.248	0.303	0.138	0.158
	Minimum	41	41	35	36
	Maximum	51	53	40	42
	Range	10	12	5	6
	Variance	9.807	14.665	3.041	3.987
	Kurtosis	−1.170	−1.183	−1.314	−1.233
	Skewness	−0.088	0.164	0.074	0.040
	Standard deviation	3.132	3.829	1.744	1.997
Influence Group	Mean	46.19	51.18	37.29	43.37
	Standard error of the mean	0.266	0.161	0.136	0.184
	Minimum	41	48	35	40
	Maximum	51	54	40	47
	Range	10	6	5	7
	Variance	11.336	4.137	2.938	5.429
	Kurtosis	−1.370	−1.247	−1.160	−1.235
	Skewness	−0.078	−0.100	0.179	0.092
	Standard deviation	3.367	2.034	1.714	2.330

factor of social identification may also have contributed to an increased interest in entrepreneurship. Observing successful figures from the business community enabled students to better associate themselves with an entrepreneurial career, thereby enhancing their motivation to further engage with the subject and develop their own projects (Li et al., 2023; Patra et al., 2023). Nonetheless, it is important to consider that the effect of tutor presence may vary depending on individual student characteristics, their initial level of motivation, and their prior experience in the field. Future research could focus on identifying potential moderators and mediators of this influence, as well as exploring the long-term effects of such educational interventions.

The involvement of tutors, who provide students with practical experience and share their successes and challenges, contributed to an increase in both extrinsic and intrinsic motivation while simultaneously reducing amotivation, as highlighted in previous research (Li et al., 2023). The increase in entrepreneurial interest is also a key finding, as real-life examples and interactive workshops make learning more vivid and engaging, as described in one study (Mudalige, 2023). This aligns with data indicating that emotional engagement stimulates interest and motivation in studying entrepreneurship (Silva et al., 2024). Moreover, the impact of tutors on students' future aspirations, as noted in another study (Frese & Gielnik, 2023), underscores the importance of mentorship for developing confidence and long-term professional goals. Another article also suggests that improved academic performance may be linked to the multifaceted mentoring provided by tutors, which enhances understanding and application of knowledge (Postigo et al., 2020). Tutor involvement also contributed to reduced procrastination and improved overall student well-being, as indicated in another study (Patra et al., 2023), highlighting the importance of addressing procrastination and enhancing well-being for successful learning. The current findings are supported by other research discussing the relationships between procrastination and academic motivation (Magdová et al., 2021), emphasizing the need for further investigation and the integration of new approaches into educational programs to enhance competencies in entrepreneurship (Chen & Ifenthaler, 2023).

Also, these findings are characterized by a significant improvement in academic motivation, interest, and performance in the intervention group compared to the control group, which can be explained by the impact of tutors' intervention and competencies (San-Martín et al., 2022). The intervention's positive effect on academic motivation can be explained by the tutor's ability to bridge the gap between theoretical concepts and practical application. The tutors provided students with a sense of relevance and purpose by sharing their practical experiences, challenges, and successes. This personalized mentoring likely strengthened their belief in their academic motives thus increasing two types of motivation and decreasing amotivation (Xia, 2022). A dynamic approach was enriched by the tutors' industry knowledge and the faculty's theoretical and scientific knowledge. It has shown benefits, which may be due to the additional influence of tutors (Kany, 2021).

The tutors also played a key role in increasing interest in entrepreneurship as the stories of entrepreneurial action with interactive workshops and real-life case studies were expected to give students a tangible look at the complex and exciting field of entrepreneurship. The ability of tutors to ignite curiosity and provoke deeper concern probably contributed to the notable increase in interest in the intervention group since the tutor's personality is extremely important in teaching (Guill et al., 2020). After getting practical ideas from tutors, students could be inspired to explore entrepreneurial concepts and opportunities more deeply thus fostering a genuine enthusiasm for learning but learning from private tutoring (Hajar, 2018).

The impact of the current intervention on academic achievement can be explained by the multifaceted guidance and tutor's mentorship in collaboration with the teacher (Xia, 2022). The tutors' real-life experience provided students with a practical set of tools to excel in an entrepreneurship course and illustrated how theoretical concepts and calculations translated into actionable strategies and results. The tutor allowed students to increase their knowledge, thus showing the effectiveness of both the program itself and the tutors involved in the study (San-Martín et al., 2021). Moreover, their mentorship likely contributed to a clearer understanding of the course, better understanding, and, therefore, higher academic achievement. The proactive and personalized approach played a role in improving academic outcomes in the intervention group, which indicated the benefit of involving tutors in higher education (Salaeva & Akimova, 2022).

Xia (2022) stated that broad-minded, self-disciplined, and positively characterized tutors were the key to improving innovation and entrepreneurship learning. Based on many years of practical experience, Xia (2022) pointed out that the combination of theoretical and practical research had positive effects, which were also confirmed in the current research. Ha (2022) explored the participation of industry professionals and the barriers to their participation in integrated learning. The thematic analysis showed that only events organized in the workplace promoted the active participation of industry professionals and their contribution to student learning (Ha, 2022). The orientation of university departments towards the selection of industry professionals working in leadership positions, the lack of support from university departments, and the lack of time for industry professionals have been identified as the main barriers to professional participation (Ha, 2022), which should be taken into account when designing influencer programs and engaging tutors.

Hamburg (2021) indicated that entrepreneurship education can increase students' entrepreneurial skills and intentions but research findings and experience showed that entrepreneurship education is still based on conservative models rather than promising ones. Hamburg (2021) demonstrated the benefits of an interdisciplinary perspective and mentoring, which indicated the relevance and possibility of including tutors in education. Also, some studies confirmed the positive effect of tutoring on student motivation; working with tutors increased self-confidence and interest in learning (Hajar, 2018), and also helped to participate more actively in classes (Jansen et al., 2020).

5. Conclusion

This study aimed to assess the impact of student interactions with entrepreneurial mentors on their motivation, interest in entrepreneurship, and academic performance. The findings confirmed that the integration of mentors into the educational process significantly enhances both extrinsic and intrinsic motivation among students. Specifically, participants in the experimental group exhibited an increase in extrinsic motivation by 8.76 points, intrinsic motivation by 6.10 points, and a decrease in amotivation by 3.05 points. These results indicate that mentor participation not only strengthens students' academic motivation but also reduces the sense of educational futility often associated with traditional approaches.

Furthermore, an analysis of engagement levels demonstrated a significant increase in students' interest in entrepreneurship and their entrepreneurial aspirations following interaction with mentors. This finding supports the hypothesis that mentors' personal experiences, success stories, and active involvement of students in real-world entrepreneurial processes contribute not only to theoretical comprehension of the subject but also to the development of entrepreneurial thinking.

Another important conclusion of the study is the positive effect of the mentorship model on academic performance. In the experimental group, the proportion of students who achieved the highest grade (90–100) was 18.1 % higher than in the control group. Notably, no participants who completed the mentorship program received unsatisfactory grades.

This study represents a significant contribution to the field of entrepreneurial education by emphasizing the psychological mechanisms that influence students' motivation, interest, and academic success. Unlike previous research, which has predominantly focused on the structural aspects of educational programs, this study examines the direct impact of student interactions with entrepreneurial mentors on

their engagement in the learning process and the development of entrepreneurial thinking.

A key distinction of this study lies in its interdisciplinary approach, integrating psychological, pedagogical, and entrepreneurial concepts. While traditional methods of entrepreneurship education are primarily confined to the university setting, this study proposes and evaluates a model in which students engage with mentors from the real business environment, highlighting its innovative nature. The findings underscore the necessity of re-evaluating conventional approaches to entrepreneurship education in universities and integrating real-world business experience into the curriculum.

Future research could focus on examining the long-term impact of mentorship programs, identifying optimal models of student-mentor interaction, and exploring the factors influencing individual student receptiveness to this form of learning.

5.1. Research limitations

This study has limitations that should be considered. The findings cannot be easily generalized beyond the specific context and participants. Sample size, although significant, may limit broader applicability. Self-assessment data, a specially designed first-time questionnaire, and a six-month study duration may not reflect long-term effects. In addition, the findings may be affected by external factors and variability in tutors' approaches, personal characteristics, and teaching styles.

CRediT authorship contribution statement

Qian Li: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Zhaoping Zhang:** Writing – review & editing, Supervision, Software, Resources, Project administration, Methodology, Investigation, Conceptualization. **Shien Xiao:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Conceptualization.

Informed consent

All participants gave written informed consent to participate in the research.

Ethics approval

The research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The research was approved by the local ethics committees of Hebei Normal University (Protocol no. 4993 dated from 02/02/2022).

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Declaration of competing interest

Authors declare that they have no conflict of interest.

Appendix 1. Interest in entrepreneurship and future aspirations questionnaire

1: Interest in entrepreneurship

1. I find the concept of entrepreneurship to be intellectually challenging.
2. Studying entrepreneurship is important for my personal and professional growth.
3. I am attracted to the study of innovative business ideas and strategies.
4. I believe that studying entrepreneurship can equip me with practical skills applicable to various fields.
5. Entrepreneurship courses grab my attention for their relevance to the real world.
6. I like to analyze successful business models and business cases.
7. I am intrigued by the process of identifying and capitalizing on business opportunities.
8. Studying entrepreneurship awakens my curiosity and the desire to acquire knowledge.
9. I am passionate about understanding the challenges entrepreneurs face and how they overcome them.
10. The thought of creating and implementing business plans excites me.

2: Future entrepreneurial aspirations

1. I am considering starting my business in the future.
2. I get excited when I imagine myself as an entrepreneur.
3. Owning and managing a business is an important goal in my plans for the future.
4. I am interested in contributing to society by developing innovative products or services.
5. The idea of taking calculated risks in a business venture resonates with me.
6. I see entrepreneurship as a way to express my creativity and innovative thinking.
7. The potential for financial success through entrepreneurship is attractive.
8. I am determined to turn my entrepreneurial ideas into real businesses.
9. I feel a strong desire to make a meaningful impact on the business world through entrepreneurship.
10. Exploring new business opportunities energizes me and encourages my professional aspirations.

Data availability

All data generated or analyzed during this study are included in this published article.

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