

THE IMPACT OF TRANSFORMATIONAL MENTOR LEADERSHIP ON POSTGRADUATES' INNOVATION PERFORMANCE

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ABSTRACT

The Chinese government attaches great importance to innovative talents and has taken various measures to improve the quantity and quality of innovative talents. In the past twenty years, the scale of graduate students in China has been rapidly developing, providing talent support for the country's development. The Chinese Ministry of Education has put forward higher requirements for the quality of graduate education. Graduate students have indeed made significant contributions in innovation, but it cannot be ignored that with the rapid expansion of the number of students on campus, there are indeed many problems with the quality of training. Therefore, many scholars have conducted research on this. The role of mentors in graduate education is beyond doubt. Scholars have explored from multiple perspectives how mentor guidance affects the quality of graduate education, with particular attention paid to the differences in training quality caused by differences in guidance styles. After analyzing numerous studies, this article found that there is still a research gap in the impact path of transformational mentors on graduate innovation performance.

Keywords: Innovation performance, Transformational Mentor Leadership, Team Atmosphere, Innovative Self-efficacy

INTRODUCTION

1.1 Background

As the highest level of academic education, postgraduate education is an important symbol of the country's development level and potential, and an important reflection of the academic level and research strength of schools. The quality of postgraduate education is directly related to the reform, innovation, and connotation development of universities, the level of higher education, and the future core competitiveness of the country. Data released from the annual National Statistical Bulletin on the Development of Education issued by the Ministry of Education of China (<http://so.moe.gov.cn/s?siteCode=bm05000001&tab=all&qt=13/05/2023>), in the past 20 years, the enrollment scale of Chinese postgraduates has increased greatly.

The demand for innovative talents in China has led to the rapid development of graduate education. The average age of members of famous aviation teams in China, such as the Chang'e team and the Shenzhou team, is 33 years old, while the average age of members of the Beidou Navigation team is 35 years old. They are basically excellent postgraduates independently trained in China. The postgraduates in China has become the most active force in the national innovation system. As a new force in innovation, postgraduates are playing an increasingly important role in the field of scientific and technological innovation in China, playing a positive role in promoting scientific and technological progress and innovation. With the continuous expansion of postgraduates enrollment, more people have the opportunity to pursue higher-level degrees.

1.2 Problem Statement

However, according to public information from the Ministry of Education and many universities, overall, graduate education cannot fully meet the diverse needs of economic and social development, and the quality of training still behind the international advanced level. Meanwhile, it can also be learned from some university administrators that an increase in the number of postgraduates does not necessarily mean a similar increase in their research achievements. From the papers published by Chinese scholars in recent years, it can be seen that the academic community in China generally believes that there are many problems with graduate education, among which the most prominent is the low output of high-level research results and unsatisfactory innovation ability(Chu & Ye, 2021)[1].

Chinese researchers are paying attention to the impact mechanism of mentors on postgraduates' innovation ability, creativity, or innovation performance, and researchers have confirmed the impact of transformational mentor leadership on postgraduates' innovation. At the same time, in the process of graduate training, teams are almost indispensable, and the psychology of postgraduates is gradually receiving attention. The main influencing factors on postgraduates' innovation ability include personal factors, mentor factors, and environmental factors(Cai, 2022)[2]. Personal factors include individual characteristics, individual abilities and non-intellectual factors, such as innovative self-efficacy, scientific research self-efficacy, etc.(Gao & Wang, 2016; Cui, 2018)[3][4]. The mentor factors are more focused on studying guidance style and mentor leadership(Jia, 2017; Peng, 2021) [5][6]. The environmental factors mainly include team atmosphere and innovation atmosphere (Liu, 2018; Liu, 2022)[7][8]. From the research results, it can be seen that these three factors have a greater or lesser impact on postgraduates' innovation performance, and even interact with each other and jointly affect postgraduates' innovation performance. Therefore, it is necessary to optimize the impact mechanism of these three factors based on the innovation oriented postgraduate training goals.

1.3 Research Gap

Chinese researchers have attempted to identify the impact mechanism of mentors on graduate students through empirical research, but there are relatively few studies that involve leadership. For the research subjects, most studies have shown that mentors can directly influence the creativity of graduate students. Meng (2015)[9] found through literature review that transformational leadership and the four behaviors it encompasses have a positive impact on individual creativity. Compared to other types of leadership, transformational leadership has a more significant impact on individual creativity. However, there is currently limited research on transformational mentors. A search on CNKI for "transformational mentors" only found 6 Chinese literature articles (including journal and degree theses), and one of them did not conduct empirical research.

Although people are aware of the significance of postgraduates' innovation performance for national technology, economy, and social development, there is still a research gap on how to improve it,

especially for graduate innovation performance in Guangxi. This involves both external environmental factors and individual internal factors, which need to be considered more comprehensively. This study aims to investigate and analyze the current innovation status of postgraduates in Guangxi, attempting to explain the reasons for insufficient innovation performance from internal and external influencing factors, and propose improvement suggestions. At the same time, innovate in theoretical models and research methods.

LITERATURE REVIEW

In the past decade, due to the needs of domestic industrial transformation and the pressure of the severe international situation, the demand for high-level innovative talents in China has been increasing day by day. Talent policies need to be improved, and further reforms are needed in education to better cultivate young people's innovation awareness and ability (<http://www.moe.gov.cn/05/05/2023>). Chinese scholars have conducted limited research on the creativity and innovation abilities of graduate students, as well as on the guidance of mentors. In these studies, the author found that transformational mentors have a significant impact on graduate innovation, but the pathways of influence have not been explored enough. Therefore, this study decided to delve deeper into this topic.

2.1 Theoretical Basis

Chinese scholars often use Social Cognitive Theory to explain the relationship between individual behavior, cognition, and environment when studying the influence of mentors on postgraduates. In other research fields, the author also found that the Theory of Multiple Intelligences and Emergence Theory are so useful in this study.

2.1.1 Social Cognitive Theory

In the 1980s, Bandura proposed the theory of social cognition, which includes the theory of ternary interaction determinism, observational learning, and self-efficacy. According to the theory of ternary interaction determinism, an individual's behavior should be determined by the interconnection and interaction of internal factors, environmental influences, and behavior(Bandura, 1977)[10]. Some scholars believe that the three are mutually constrained and maintain a certain balance, and their mutual influence does not occur simultaneously(Wang, 2019)[11]. Observing learning includes four processes: attention process, retention process, output process, and motivation process. Bandura (1977) propose the concept of self-efficacy to explain the impact of individual beliefs on individual behavior. Self-efficacy is different from self-awareness. It is not an objective recognition of one's own abilities, but rather an affirmation of behaviors beyond one's own abilities in order to motivate effort to complete. Subsequent scholars have conducted research in different fields, and this article focuses on the field of innovation, therefore choosing innovation self-efficacy as a variable.

2.1.2 Theory of Multiple Intelligences

American scholar Howard Gardner (1983) (P.60)[12] thought that intelligence refers to an individual's specific ability to solve problems or create new products under certain value standards under external environmental influences. The theory of multiple intelligences developed from this holds that individuals should possess intelligence that can be stimulated through certain intermediaries, and education is one of the mediators that can serve as a means to stimulate potential(Li, 2013)[13].

According to this theory, in order to stimulate the intelligence of graduate students, it is necessary to cultivate their innovative factors in various aspects.

2.1.3 Emergence Theory

George Henry Lewes proposed the term emergence in 1875, which means that the whole is greater than the sum of its parts. This viewpoint has received attention and widespread recognition in various research fields. People generally believe that in an organization or team, each individual interacts and influences each other, works together, and works together to form a synergy and achieve greater results. Mentors usually cultivate graduate students within a team, so this theory effectively supports the role of the team.

2.2 Variables

Based on the analysis of research results by Chinese scholars and theoretical support, this study identified four variables, with transformational mentor leadership as the independent variable, postgraduates' innovation performance as the dependent variable, and team atmosphere and innovative self-efficacy as mediating variables.

2.2.1 Postgraduates' innovation performance

Input "innovation performance" on CNKI, resulting in 13500 journal papers and 9687 degree papers. Starting from 2021, the number of papers published each year has exceeded 1000, and in the past two years, it has even exceeded 2000, maintaining a high level of research enthusiasm. In today's world, innovation is crucial for countries, organizations, and individuals because innovation means competitiveness. Innovation performance, which can reflect the ultimate results of innovation, is increasingly valued. Chinese and foreign scholars have provided various definitions of innovation performance, but no unified conclusion has yet been formed.

Table 1 Definition of Innovation Performance

Year	Researcher	Definition
1982	Amabile	Innovation performance refers to the innovative and practical ideas generated by individuals, reflecting their innovation ability and practical innovation.
1996	Amabile, et al.	
2006	Mcmullen & Sheherd	Employee innovation performance refers to the level of innovation, user satisfaction, and personal innovation efficiency achieved by employees during the innovation process. It is a systematic concept and an important criterion for measuring and judging the effectiveness of innovation.
2011	Yi Han	The process that employees continue to shift and improve their focus of knowledge, and continue to grow in order to gain a more stable position, covering employees' innovation will, innovation actions, innovation suggestions, innovation results and innovation thinking dissemination.
2017	Rosing & Zacher	Employee innovation performance refers to the proficiency of employees in designing behaviors for innovative outcomes, including generating and implementing novel and beneficial ideas.

2020 Liu,J. Innovation performance has two decisive characteristics: uniqueness and usefulness.

In China, the definition of postgraduates' innovation performance has also undergone the development of scholars, gradually shifting from a relatively singular view that innovation achievements are academic papers to a more comprehensive evaluation. This study analyzes the research of scholars and the national evaluation standards for the quality of graduate education, and believes that the innovation performance of graduate students should not only include innovative achievements, but also the awareness, ability, and spirit of obtaining innovation. Especially for masters, possessing these qualities and abilities can lead to innovative achievements in the future.

2.2.2 Transformational Mentor Leadership

In the research on the influencing factors of postgraduates' innovation behavior, innovation ability, innovation performance, etc., the guidance of mentors is generally considered as one of the important external factors, and various mentoring styles have been proven to have an impact on postgraduates' innovation. Scholars have attempted to introduce research on leadership into graduate education and have found that various types of leadership play a more or less positive role. Chinese scholar Yin Xiaodong (2014) [14] confirmed the value of mentor guidance for postgraduates after conducting a survey of over 1000 postgraduates with mentors. Based on the research purpose of this article, the leadership of transformational mentors has become the research object.

There is a lot of research on transformational leadership in the field of management, but graduate education is still in the exploratory stage. However, scholars have relatively consistent research on the leadership of transformational mentors, with similar focuses, especially on the mechanism of innovation impact on postgraduates. Therefore, in the context of Chinese society, transformational mentor leadership can be defined as the ability and character to guide postgraduates and teams to achieve common goals.

2.2.3 Team Atmosphere

As is well known, the cultivation of Chinese postgraduates is basically carried out within a team, so the role of team atmosphere cannot be ignored (Huang & Ning, 2017)[16]. Scholars have a relatively consistent definition of a team, which can generally be considered as two or more individuals gathering into a group due to the same goals. The postgraduates' team is also a research team organized by mentors based on the same goals. The difference between graduate teams and other teams is that members mainly trust and work together around scientific research projects (Zhang, 2018)[17]. Due to the shared goals of the team, a team atmosphere is usually formed, which can also promote trust and identification among team members in order to better achieve team goals (Zhang & Fang, 2018)[18]. This study suggests that the postgraduate team atmosphere refers to the shared understanding formed by the postgraduate team under the guidance of their mentors, working together around scientific research goals.

2.2.4 Innovative self-efficacy

In the social cognitive theory of American psychologist Bandura, it is proposed that self-efficacy can influence an individual's decisions and behavior, as it is a prediction of the possible outcomes of an individual's behavior, which usually leads to the active implementation of that behavior. There is no consensus among researchers on whether self-efficacy is specific to a particular field or does not shift

due to changes in the field. Based on Bandura's research, scholars such as Schwarzer have divided self-efficacy into general self-efficacy and special self-efficacy. The former refers to an individual's overall self-confidence when facing various or new environments, while the latter refers to the expectation of completing specific tasks in a specific field (Schwarzer, 1997)[19]. In the field of education, scholars have also proposed various special self-efficacy, such as academic self-efficacy, innovative self-efficacy, entrepreneurial self-efficacy, and so on. The research object of this article is innovation performance, so we chose to study innovative self-efficacy.

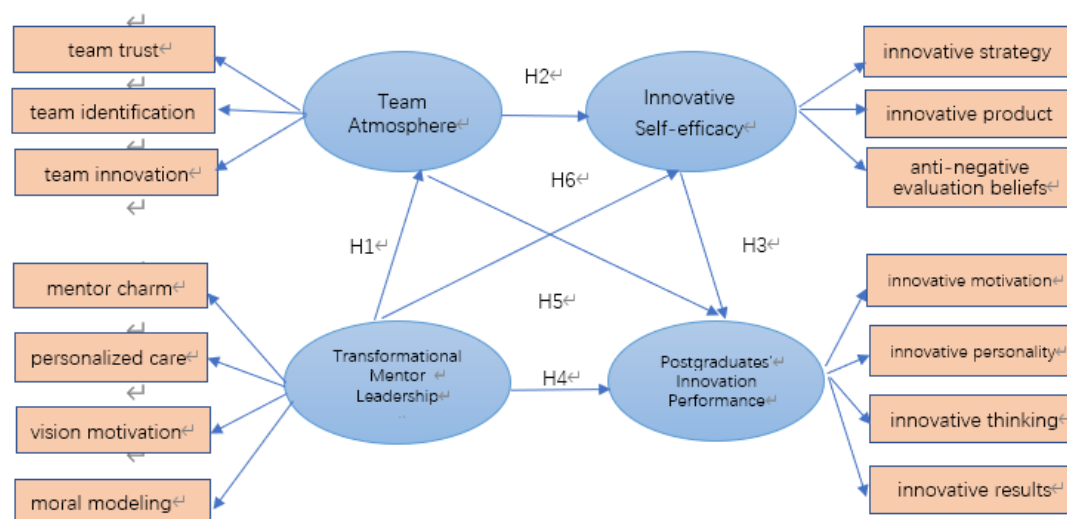
Innovation self-efficacy is the self-judgment of postgraduates, through which individuals generate sufficient information about their own innovation to better implement innovative behavior (Wang et al., 2021)[20]. Individuals with high self-efficacy in innovation judge themselves as possessing innovative abilities, and therefore are more willing to complete tasks in innovative ways and methods (Dai, 2017)[21]. Therefore, innovative self-efficacy has a very positive significance for innovation, as it enables individuals to have confidence in innovation and actively implement innovative behavior.

2.3 Theoretical Framework

According to the theory of ternary interaction, the external environment, internal factors, and behavior should be mutually influenced and determined. The external environment can effectively influence individual subjective judgment, which directly affects individual psychology, providing a theoretical basis for studying the relationship between environment and individual psychology (Yoshida, 2014)[22]. For graduate students, mentors and teams are the external environment, and innovative self-efficacy is an internal factor, both of which have an impact on the innovation performance of postgraduates. Based on the literature review above, this article constructs the following theoretical framework. The relationship between the four variables is as follows: postgraduates' innovation performance as the dependent variable, transformational mentor leadership as the independent variable, team atmosphere and innovation self-efficacy as mediating variables.

Figure 1

Theoretical Framework



CONCLUSION AND FUTURE WORK

3.1 Conclusion

Cultivating innovative talents is an important support for the development of today's era, and promoting the cultivation of innovative talents is the goal pursued by postgraduate education. This study is based on the support of national policies and local development needs, and proposes a study on the impact mechanism of postgraduates' innovation performance, which has practical significance. Mentors bear the heavy responsibility of cultivating postgraduates with innovative spirit and ability, so how mentors guide postgraduates has become the focus of research. After extensive literature review and analysis of Chinese social practice, this article constructs a theoretical framework and preliminarily reveals a pathway through which mentors influence postgraduates' innovation performance.

This study fills some research gaps in this field and has both theoretical and practical significance. In theory, this study fills the research gap in the mechanism of the impact of transformational mentors on postgraduates' innovation performance. In practice, this study conducted in-depth research in various universities in Guangxi Zhuang Autonomous Region, China, providing a basis for local graduate education management to formulate policies.

3.2 Limitation and future work

This study only focuses on the leadership of transformational mentors, but the guidance styles of mentors are vastly different. The research data can only reflect the influence mechanism of one style, and cannot fully reveal the pathways through which mentors influence postgraduates' innovation performance. In future research, research can be conducted from various types of mentors.

This study takes master's students from several universities in Guangxi Zhuang Autonomous Region, China as samples. China has a vast territory and significant differences in economic development among different regions. Studying only one province does not necessarily represent the same research results as other provinces. Therefore, in the future, the research area can be expanded, which may reveal more influencing mechanisms.

Furthermore, in terms of mediating variables, further exploration can be conducted in the future to identify more influencing factors.

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