The Influence of Member Matching Degree on Interdisciplinary Team Collaboration Efficiency

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ABSTRACT

In order to explore the effect of team members' matching degree on the efficiency of interdisciplinary team collaboration. This study has utilized Likert Scale to make questionnaires, which were then tested and corrected by simple reliability and validity analysis. The questionnaires were distributed online to investigate the correlation between matching degree and collaboration efficiency. A total of 402 questionnaires were collected and screened. Finally, 346 questionnaires were testified as valid. The SPSS software was then utilized to test the reliability and validity of the data and also make multiple regression analysis. The conclusions were drawn as followed: ① The matching degree of members affects the team collaboration efficiency of interdisciplinary teams. ② The matching degree of behavior and disciplinary knowledge have a positive and significant impact on the efficiency of interdisciplinary team collaboration. ③ Goal matching has a significant impact on the execution efficiency of interdisciplinary teams, but has no outstanding impact on the communication efficiency. ④ Compared with matching of communication behavior, the matching of execution behavior has a more significant impact on the collaboration efficiency of interdisciplinary teams. ⑤ The frequency of team members participating in team collaboration has a significant impact on the matching degree of disciplinary knowledge and communication efficiency.

Keywords: Member matching, Collaborative efficiency, Interdisciplinary, Multiple regression

INTRODUCTION

With the emergence of more and more cross-domain problems in research, the degree of specialization segmentation and complexity is increasingly enhanced, researchers in order to break disciplinary boundaries, integrate the knowledge of different disciplines, and jointly propose solutions. In order to better cope with the complex, fuzzy, fast-changing and uncertain environment, the interdisciplinary team is gradually emerging. How to build an efficient interdisciplinary team is the focus of practice. Based on this, this paper conducted a quantitative study on the relationship between member matching degree and interdisciplinary team cooperation efficiency, intended to find the relationship between member matching degree and team efficiency

in interdisciplinary teams, so as to provide relevant support for promoting interdisciplinary team cooperation in universities.

RESEARCH BACKGROUND AND SIGNIFICANCE

This topic studies the influence of member matching degree on the efficiency of interdisciplinary team cooperation. With the gradual deepening of globalization and the rapid development of economy, countries and enterprises have put the cultivation of innovative talents in the first place. In this context, higher education is transforming from "basic support service" to "innovation-leading power" (Su Xiaoqiong 2021). In order to effectively improve the innovation ability of talents, teamwork, which is commonly used to improve the production efficiency of enterprises, has increasingly become an indispensable mode of college students' learning.

At the same time, with the deepening of discipline construction and the further clarification of industrial development strategy, all walks of life put forward more urgent requirements for the cultivation of high-end interdisciplinary talents in the field of higher education, expecting them to have diversified, comprehensive and interdisciplinary abilities to adapt to the complex and changeable competitive environment. Based on this, interdisciplinary collaboration has become one of the important modes of college students' teamwork. For example, the Industrial Design Department of Tsinghua University has cooperated with the School of Materials and the School of Medicine to enhance the interdisciplinary cooperation opportunities for graduate students majoring in design. However, the special nature of interdisciplinary determines that it can not only promote team members to broaden their knowledge breadth and develop their skills, but also affect college students' learning willingness and efficiency to some extent.

Some scholars have clearly pointed out that the degree of matching between individuals and the environment is an important factor affecting the individual behavior and work performance of members (Cao Han. 2021). When the team atmosphere is good, members have a strong sense of belonging to the team and trust each other, communication and sharing become more frequent, and they are satisfied at the psychological level, so that they can devote themselves to the work with a positive attitude and create more value. On the contrary, the low matching degree of members is not conducive to the creativity of members.

In previous researches, the academic circle has paid much attention to the member matching degree, mainly studying the relationship between the individual and the team effectiveness, while the research on the matching degree among the team members is less. However, interdisciplinary collaboration is a special form of team cooperation, and there are relatively few researches on the relationship between them at home and abroad. Therefore, based on the investigation of the member matching degree, this study intends to take college students (including undergraduates and postgraduates) as the research object, aiming to investigate the influence of the member matching degree at the team level on the cooperation efficiency of college students'

interdisciplinary team, that is, to explore the influence of the matching degree among team members on the team efficiency.

Research Theory

Member Matching Degree

Matching degrees, due to personal environment interaction theory, it considers personal attitude and behavior depends on the individual characteristics of compatibility with the environment. Person-Team fit refers to the compatibility between individuals and their teams (Cai Di 2019). In proposing this concept, the author emphasizes the issue of hierarchy, placing matching at the team level, that is, focusing on the interaction between people in the team. Therefore, this study puts forward the member matching degree at the team level to clarify the matching relationship between team members.

Interdisciplinary and Interdisciplinary Teams

Interdisciplinarity is a research method to break the original disciplinary barriers, and to solve complex problems and achieve innovation by integrating multidisciplinary knowledge, tools and structures (Wu Zhaoyang, 2016). Interdisciplinary team is a new organizational model that gathers multidisciplinary knowledge resources. Its advantage lies in overcoming the insufficient stock of individual or single discipline knowledge and ultimately realizing knowledge or technology innovation through the communication and collaboration of team members (Guan Hui, 2015).

Research Significance

The matching at the level of interdisciplinary teams is the complementary matching that is achieved on the basis of consistent matching. Compared with the traditional scientific research team with a single form, the interdisciplinary team in universities has some new characteristics. The benign development of interdisciplinary teams can enable team members to expand the breadth of knowledge of different disciplines, develop skills, such as teamwork, critical thinking, and effectively improve their abilities. It is convenient to propose creative solutions by integrating perspectives from multiple fields and perspectives, and effectively promote the cultivation of interdisciplinary talents.

However, the interdisciplinary teams of universities in our country have some problems, such as uncertain organizational goals and lack of vitality (Zhang Xinggui, 2012). How to ensure the long-term healthy operation of interdisciplinary teams still needs further exploration, which has important practical significance for promoting the innovation and transformation of scientific research achievements, cultivating innovative talents, and improving the level of social science and technology.

In this study, by collecting the data of three quantifiable dimensions of "member matching degree" in the index of "member matching degree" : goal matching degree, behavior matching degree (which can be divided into communication behavior and execution behavior) and discipline knowledge matching degree, the influence of member matching degree on

Table 1. Variable definition.

Variable symbol	Variable name		
Independent variable: Member matching degree	Target matching degree		Our team can set a common goal Our team is always consistent with our goals
	Behavior matching degree	Communication behavior matching degree	Our team members are able to listen to others very well The communication atmosphere within our team is pleasant
		Executive behavior matching degree	In the process of completing the work tasks, our team can solve the problems that arise together During the completion of the work tasks, our team members can coordinate each other's work I was able to learn new subjects from other team members
	Matching degree of subject knowledge		The subject knowledge of our team members matches the team's work tasks
Dependent variable: Teamwork efficiency	Communication efficiency		We were able to respond very quickly
			In communication, we can get results quickly
	Execution efficiency		We can finish the task on time We are able to do high-quality work

interdisciplinary team collaboration efficiency is analyzed from different angles. It provides strong support for the important factors affecting the efficiency of interdisciplinary team cooperation and helps to expand the theory of individual environment matching.

Research Method

This study uses the method of combining theory and empirical research, qualitative and quantitative research. Specific research methods and tools are as follows:

A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used to design the questionnaire. The main contents include target matching degree (2 questions), team behavior matching degree (4 questions), subject knowledge matching degree (2 questions); Communication efficiency (2 questions), execution efficiency (2 questions).

After the questionnaire was collected, the preliminary invalid questionnaire was excluded, and then the valid questionnaire data were tested for

reliability, validity, multiple linear regression analysis, variance analysis, etc., using SPSS software.

Research Design

Through in-depth analysis of member matching degree, the research elements of the topic "Research on the impact of member matching degree on interdisciplinary team cooperation Efficiency based on multiple regression model" are divided into independent variables and dependent variables. The independent variable is divided into three measures, namely, goal matching degree, behavior matching degree and discipline knowledge matching degree, and the dependent variable is communication efficiency and execution efficiency. See Table 1 for details.

Research Process

The questionnaire was compiled according to specific measurement items. The questionnaire was tested for simple validity. A total of 130 questionnaires were collected after the initial release, among which 119 were valid. The correct rate of each item reached 80% or above. The flow chart of this study is shown in (see Figure 1).
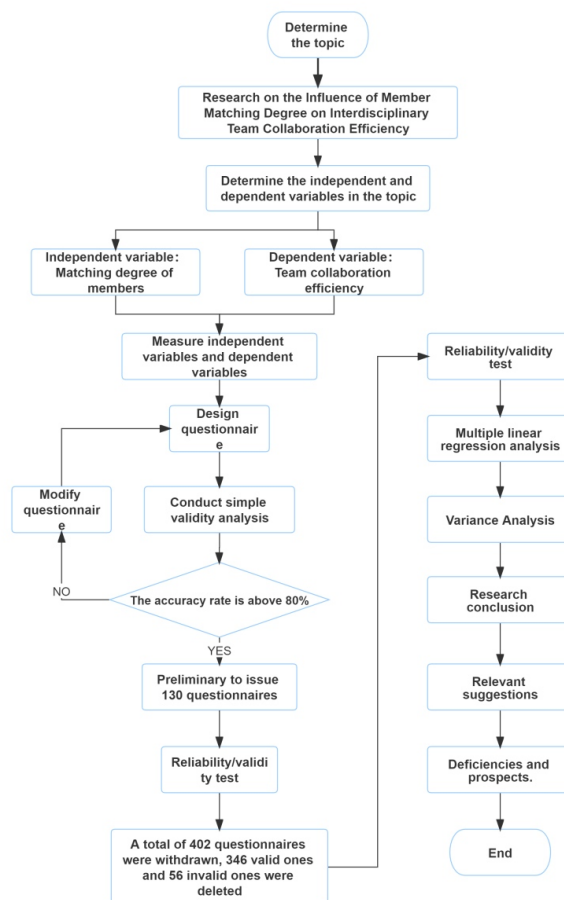

Figure 1: Study flow chart.

DATA ANALYSIS

Questionnaire Reliability and Validity Test

The reliability of 12 items in the questionnaire was tested using SPSS and the results are detailed in (see Tables 2, 3). The total clonal Bach α coefficient was 0.907, greater than an acceptable criterion of 0.7. This indicates that the study data has high reliability and allows analysis of valid data.

SPSS was used to test the validity of 12 items of the 5 scale questions in the questionnaire. The KMO value is 0.948, which is greater than the standard of 0.7. The significance level of Bartlett's value Sig is infinitely close to 0.000, indicating that the validity of the study data is high and can be used to analyze the valid data.

Descriptive Statistics

The study period of the respondents covered undergraduate, master's and doctor's degrees. Among them, 178 were postgraduate students, accounting

Table 2. Total reliability test of effective questionnaire (364 copies).

Sample size	Number of items	Cronbach's alpha
346	12	0.907

Table 3. Total reliability test of effective questionnaire (364 copies).

Dimension	Question item	α after deleting item	α
Independent variable 1: Target matching degree	Q7: Our team can set a common goal	0.892	0.907
	Q8: Our team is always consistent with our goals	0.892	
Independent variable 2: Behavioral matching degree	Q9: Our team members can listen to others' opinions well	0.895	
	Q10: The communication atmosphere within our team is pleasant	0.893	
	Q11: In the process of solving the work tasks, our team can solve the problems together	0.889	
	Q12: During the task process, our team members can coordinate each other's work	0.892	
Independent variable 3: The matching degree of subject knowledge	Q13: I can learn new subject knowledge from other team members	0.903	
	Q14: The subject knowledge of our team members matches the work tasks of the team	0.893	
Dependent variable 1: Communication efficiency	Q15: We can respond quickly	0.892	
	Q16: In the communication, we can quickly get the results	0.892	
Dependent variable 2: execution efficiency	Q17: We can finish the task on time	0.895	
	Q18: We can do high-quality work	0.893	

for 51.4% of the total number surveyed; The sample of undergraduate students was 165, accounting for 47.7% of the total number investigated; The sample of doctoral candidates was 3, accounting for 0.9% of the total number of respondents; As can be seen from the pie chart, the respondents of this survey are mainly undergraduates and postgraduates, with the largest number of respondents being first-year postgraduate students.

Among the respondents, 133 people occasionally participated in interdisciplinary teams, accounting for 38.4% of the total number of respondents; Sometimes participating in the interdisciplinary team sample of 90 people, accounting for 26% of the total number investigated; The sample of 85 people who often participate in interdisciplinary teams, accounting for 24.5% of the total number surveyed; The sample that always participated in the interdisciplinary team was 38 people, accounting for 10.5% of the total number surveyed; See the figure on the left for specific data. It can be seen that all interviewees have participated in interdisciplinary teams.

Multiple Regression Analysis of the Member Matching Degree and the Efficiency of Interdisciplinary Teamwork

Multiple linear regression analysis is a statistical analysis method to establish the quantitative relation of linear mathematical model among multiple variables and analyze it with sample data. In this paper, SPSS was used to establish and solve the multiple regression model of the relationship between independent variables and dependent variables. The results can be used for prediction and evaluation.

In order to explore the impact of member matching degree on interdisciplinary team cooperation efficiency, this study divided member matching degree into three measures, namely, goal matching degree, behavior matching degree and discipline knowledge matching degree, which are three independent variables. Team cooperation efficiency is divided into communication efficiency and execution efficiency, which are two dependent variables. Aiming at the two dependent variables of communication efficiency and execution efficiency, this paper adopts SPSS 27.0 to establish multiple regression models for them respectively. At the same time, in order to facilitate the measurement of behavior matching degree, behavior matching degree is divided into communication behavior matching degree and execution behavior matching degree. Multiple linear relationships between independent variables and dependent variables were established twice to facilitate the exploration of the influence of communication behavior matching degree and execution behavior matching degree on dependent variables.

The multiple linear regression relationship between target matching, behavior matching and subject knowledge matching and communication efficiency was explored, and the regression results are shown in Table 4.

The significance value of the behavioral matching degree and subject knowledge matching degree was less than 0.001, indicating that the two independent variables had a significant impact on the communication efficiency, and the target matching degree was 0.282, greater than 0.05, indicating

Table 4. Analysis results.

Model	Unstandardized coefficient		Standardized coefficient	t	P
	B	Standard error	Beta		
(constant)	0.393	0.138		2.836	0.005
Target matching degree	0.056	0.052	0.058	1.079	0.282
Behavior matching degree	0.589	0.055	0.059	10.691	<.001
Matching degree of subject knowledge	0.209	0.042	0.240	4.962	<.001

that the target matching degree did not have a significant impact on the communication efficiency.

According to multiple regression analysis, both behavior matching degree and subject knowledge matching degree have significant positive influence on communication efficiency, and behavior matching degree has more significant influence on communication efficiency.

Similarly, goal matching degree, behavior matching degree and subject knowledge matching degree all have significant positive influence on execution efficiency, and behavior matching degree has more significant influence on execution efficiency.

Study Results and Discussion

The degree of member matching has a significant impact on the efficiency of interdisciplinary team cooperation, that is, the higher the degree of member matching in interdisciplinary team, the higher the efficiency of team cooperation. The higher the matching degree of the members, the higher the unity degree of the goals of the members and the team, the more consistent the team concept is with the psychological expectations of the members, so that the members and the team are more identified, trusted and supported, and the members have a stronger sense of belonging to the team, so the team atmosphere is more harmonious, and the harmonious atmosphere makes the members have a positive emotional state. As a result, more frequent knowledge sharing and less internal conflicts are generated, which improves the enthusiasm of members to cooperate and enables them to work more freely and boldly, and the efficiency of team cooperation is higher.

Compared with other influencing factors, behavior matching degree has a more significant impact on team cooperation efficiency. Among them, compared with communication behavior matching, executive behavior matching has a more significant impact on team cooperation efficiency. In the process of communication and interaction with individuals who are similar to them, team members can realize the confirmation of their own views and behaviors, while the matching of disciplinary knowledge and professional ability is more based on the team standpoint, emphasizing what members need to do and what requirements they need to achieve. In terms of meeting the needs of individual members, it has little impact on them. Therefore, the matching of goals and behaviors among members is more indispensable than the complementation of skills and knowledge. Only when the team members achieve

a high degree of matching, and supplemented by scientific work and complementary knowledge and skills, can the efficiency of team cooperation be effectively improved.

Communication is the basis of improving executive power. Good communication behavior matching degree will stimulate the improvement of executive behavior matching degree to a certain extent, thus improving the efficiency of team cooperation. Therefore, if the team can maintain a coordinated atmosphere at the execution level, its team cooperation efficiency will be improved to a greater extent.

CONCLUSION

The results fully show that it is feasible to measure the teamwork efficiency by the matching degree of communication behavior and execution behavior, and the member-team matching degree, as a new variable, can indeed improve the teamwork efficiency. Therefore, members and teams of interdisciplinary cooperation should clarify each other's core values, team culture and goals when forming and recruiting new members, so that the whole team can achieve a high degree of consistency and matching. Meanwhile, supplemented by scientific work and complementary knowledge and skills, the efficiency of team cooperation can be effectively improved.

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