

## Promotion effects of discipline-based competition on the comprehensive ability of university students: Strategies for quality improvement

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**Received Date** : Nov 21, 2022  
**Accepted Date** : Dec 30, 2022  
**Published Date** : Jan 20, 2023  
**Archived** : [www.jcmimagescasereports.org](http://www.jcmimagescasereports.org)  
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### Abstract

Discipline competition is a practical platform for enhancing the comprehensive abilities of university students. In addition, discipline competitions have positively affected scientific research improvement, innovative thinking development, practical ability exercise, team consciousness cultivation, humanistic spirit nurture, and enhancement of social competitiveness. This results in universities actively conducting discipline competitions based on regular teaching. However, the current situation has revealed countless problems, such as the low motivation of students to participate, insufficient marketing promotions in schools, weak construction of tutor teams, and fewer incentive policies in universities. This paper presents several ways to promote the development of discipline competitions in universities, such as displaying the achievements of outstanding teachers and students, strengthening the construction of instructors and student teams, and establishing special funds for discipline competitions. In addition, this paper explains and addresses the role of discipline competitions in promoting the comprehensive ability of university students and the strategies to improve the quality of discipline competitions.

**Keywords:** Discipline competitions; comprehensive capabilities; effect analysis; quality improvement strategies.

### Introduction

In recent years, universities have actively launched and participated in various discipline-based competitions due to their professional, practical, competitive, and innovative nature to cultivate students' comprehensive abilities. Furthermore, disciplinary competitions have effectively enhanced university students' comprehensive ability, developed their scientific thinking ability, exercised their practical operation ability, cultivated their humanistic spirit, and heightened their social competitiveness [1]. From this, it concluded that universities should highlight the role of disciplinary competitions in promoting the comprehensive ability of university students and prescribing adequate strategies to strengthen the construction of disciplinary competitions.

### Current status of discipline competitions

From the early 1980s to approximately 1989, higher education was gradually restored, and campus culture became increasingly favorable [2]. Against this background, campus science and technology innovation activities were officially launched.

Since 1989, the construction of discipline competitions in Chinese universities has flourished because of the first "Challenge Cup" National Competition of Extracurricular Academic Science and Technology Works for college students, hosted by the Ministry of Education, the Central Committee of the Communist Youth League and the China Association for Science and Technology, and organized by Tsinghua University. Furthermore, the development of competitions like the National Undergraduate Electronic Design Contest and the China Undergraduate Mathematical Contest in Modeling has set off a wave of disciplinary competitions in China. In recent years, discipline competitions have grown even more rapidly, covering the majority of university majors and numerous categories through the events sponsored by the Ministry of Education and the countless National Academic Associations (societies). In addition to these national events, various provincial education departments and universities have also launched discipline competitions with various forms of content throughout the majors of varying levels, which gradually earned the university students' participation.

**Citation:** Chen Jiayu. Promotion effects of discipline-based competition on the comprehensive ability of university students: Strategies for quality improvement. *J Clin Med Img Case Rep.* 2023; 3(1): 1353.

The Effect of Discipline Competitions on the Development of the Students' Comprehensive Ability As a special examination and competition mode, discipline competition effectively expands knowledge, stimulates innovative thinking, exercises practical operation ability, enhances social competitiveness, and effectively improves the university students' comprehensive ability in the participation process. The discipline competition is a powerful platform for college students to improve their innovation and practical ability, and it also highly matches the teaching objectives of the universities. These effects result in providing high-quality, innovative talents to society.

### Research literacy improvement

The core of scientific research literacy is the ability to innovate, a high-level comprehensive quality based on ideological, moral, humanistic, professional, and aesthetic qualities [3]. During a discipline competition, students must first master the relevant professional knowledge and sort it into a clear memory. Consequently, based on their memory, they must think of the extensiveness and depth, integrate it into their comprehension, and then develop valuable ideas and put these into practice. To put it bluntly, the students must creatively apply the theoretical knowledge from the textbook to their team's design work, giving it a more innovative connotation. This process not only refines the creative skills of university students but also lays the foundation for future research activities.

Furthermore, there are several similarities between scientific research and disciplinary competitions. When participating in a research project, students must have an extensive grasp of the knowledge they are investigating. However, at the same time, they need to consult a substantial amount of literature to form their ideas and innovatively develop them. They must apply their knowledge flexibly in their research activities and construct breakthroughs and creations. Copious undergraduates who participate in scientific research imitate the theoretical knowledge from books and do not take the initiative to develop their innovations; therefore, their competencies for scientific research remain stagnant. The significance of discipline competitions is to improve the innovative ability of university students and to lay a solid foundation for their future scientific work. This shows that discipline competitions can cultivate and exercise the involved students' scientific spirit and research ability and enhance their scientific literacy.

### Innovative thinking development

Creative thinking is a valuable and evident problem-solving skill [4]. In a knowledge-based economy, innovation is a necessary benefit in the face of competition and societal challenges [5]. Moreover, it is an essential core of creative ability, and innovation is one of the essential factors in assessing discipline competitions. By combining theory and practice, discipline competitions encourage students to think independently, investigate diligently, discover sensibly, and innovate bravely. The scope of knowledge and the openness of the content of the discipline competitions dictate that students are required

to apply theoretical knowledge from textbooks to practical operations and to integrate innovative thinking throughout the competition; thereby, the students exhibit learning by example. Their creative thinking and internal drive are also fully cultivated during this process. The combination of professional knowledge and discipline competitions is an excellent avenue to stimulate students' potential for independent learning and exploration and extensively cultivate their creative disposition and innovative thinking.

### Exercise in practical skills

Discipline competitions are practical activities that support students in improving their experimental, imaginative, creative, observational, and analytical skills. When participating in an academic competition, the students must apply their knowledge to analyze and evaluate selected topics. In addition, they must take advantage of the Internet and other tools to consult relevant literature, collect valuable data and information to compare and filter, and finally determine the project suitable for their team, which enhances their ability to analyze problems. The students involved must venture to conduct direct experimental operations to design and assemble products, which develops their experimental operation skills. When designing products, they must produce distinctive ideas to give their work more creativity, which exercises their imagination and skills. In addition, the students must observe and learn from the best practices of others in order to optimize their chosen projects, which also develops their observation skills. To summarize, the students' experimental, creative, observational, and analytical skills are enhanced during the competition, not only for their current practice but also as a foundation for their future work. The systematic training of the discipline competitions allows students to utilize various learning resources more actively and flexibly to enrich their knowledge structure and serve their future social practice activities.

### Promotion of team consciousness

A team is a tacit group of people who fully trust and support each other and work towards a common goal [6]. Team consciousness is reflected in three (3) aspects: the spirit of service, the spirit of collaboration, and the sense of the overall situation. Academic competitions are entered as a team, and students must divide the work among themselves, cooperate and communicate with each other, and complement each other's strengths. As a result, their abilities of interpersonal communication, organization and leadership, and cooperation and coordination are poured out, and eventually, a dedicated team consciousness is formed. Moreover, participating in discipline competitions cultivates the team consciousness of university students, which is a crucial part of nurturing the comprehensive quality education of university students. Furthermore, cultivating a sense of teamwork among university students infuses them to integrate the spirit of solidarity and collaboration into their work with others, develop excellent character, and improve their overall personal qualities [7].

### **Fostering humanistic spirit**

“Humanism” is a cultural phenomenon distinct to human society as this expresses the concern and pursuit of values and destiny of individuals [8]. It portrays a considerable role in promoting scientific and technological progress and social development; in other words, cultivating humanism in students has far-reaching significance. In participating in discipline competitions, students constantly encountered various adversities and setbacks. They may seem less confident when competing with participants above them, unable to find effective solutions beyond their cognitive scope, and may have thoughts of withdrawing and retreating. However, constant participation in competitions drives them to build self-confidence, confront their setbacks, rise to the occasion, find their way, accumulate experience from overcoming difficulties and frustrations, and meet their first success confidently. This complex challenge is conducive to forming a positive and humanistic spirit in which students oppose their weaknesses.

### **Enhancement of social competitiveness**

Social competitiveness is a person’s comprehensive ability to survive and compete in society. Discipline competitions prompt students to learn to analyze and solve problems by diligently implementing solutions and boldly conducting experimental operations to design and manufacture their entries. Consequently, this opportunity polishes their practical skills, and they can adapt to their jobs in their future work areas [9]. This fully utilizes the students’ creative potential and effectively enhances their research literacy with innovation as the core, which is conducive to their growth into talents and paves the way for their long-term development in the future workplace. Furthermore, participation in discipline competitions encourages students to develop a sense of the bigger picture, collaborate with their instructors and teammates, learn from each other, and pool their wisdom. Thus, strengthening their sense of teamwork and enabling them to collaborate better with their leaders and colleagues in their future careers. Students will inevitably encounter difficulties and setbacks when participating in discipline competitions, which requires them to be courageous to overcome their opponents and achieve good results. However, developing practical and creative skills, team spirit, and a positive and confident humanistic spirit enable students to cope with their studies, life, and work in society and enhance their social competitiveness.

### **Strategies for quality of discipline competitions improvement**

#### **Display of Outstanding Teacher and Student Achievements**

Universities must highlight the publicity and mobilization of discipline competitions by inviting representatives from institutions with outstanding teachers and students to show their achievements to set an example for students and pique their interest. Moreover, universities must guide first-year students with basic information about the discipline competitions, such as the available majors and subjects tackled, the time and method of participation, the preparation of materials, and the benefits of enlisting in the competitions.

#### **Strengthen the team of instructors**

The instructor’s role in discipline competitions is to support

the participating students from registration until the completion of the results. It is important to note that discipline competitions rely on a team of instructors that could cover an array of disciplines with rich competition experience and high competency. However, universities rarely produce a constructed team of instructors. Nevertheless, a university can build an outstanding team by utilizing the results of the discipline competitions as an indicator of the teacher’s job evaluation and promotion to increase their enthusiasm and build a stable and excellent teaching lineup. Another is through appropriate funding for the guidance of newly hired instructors with the assistance of experienced teachers by transmitting their knowledge, aiding with ideology, and relaying the work ethics to develop and expand an echelon of instructors. Furthermore, teachers interested in discipline competitions are selected to participate, or those with experience are invited to join to train the team of instructors and improve their overall quality.

### **Highlight the formation of the participating students**

Students are the core of the competition process; therefore, they must provide basic training during their initial university years to become the team’s main participants in the future when they are in their later years. As part of the training, the experienced students must educate the newly joined students to become more familiar with and participate in specific tasks of the competition and gain a real sense of perception and experience of the event. In doing so, the newly joined students assess their suitability to participate in the discipline competition, clarifying their goals. Consequently, these processes follow the saying that the old and skilled will lead the new, the best will train the best, and the best will learn from each other. Thus, an amiable competition atmosphere is created, and a ladder of students is established.

### **Establish specific funding for discipline competitions**

A discipline competition guarantees success because the universities allocate funds and resources to reward teachers and students who perform exceptionally in the competition [10]. Regarding funding sources, this can be received through national, provincial, municipal, university, or community departments. The qualifications for the reward are through their involvement in guidance and competitions. They are given to students with outstanding results and support them to participate in academic exchange activities, publish academic papers, and apply for patents to widen their capabilities extensively. In addition, group awards should be given to secondary colleges with active participation and positive response to realizing a graded award policy. Moreover, additional awards can be named in various categories, for example, the Best Newcomer Award and Enthusiastic in Participation Award, to encourage the newly joined students to participate and engage in the competitions.

### **Sound experimental conditions**

A factor in determining the quality of the completion of disciplinary competitions is the use of laboratories to complete their results, such as the competitions done by the National University Physics Experimental Competition and the University Chemistry Competition. Presently, universities experience the problems of aging experimental equipment, the inad-

equate management system of instruments and equipment, and insufficient professional knowledge reserve of laboratory managers, which inevitably impacts the results, whether direct or indirect [6]. The strategies universities can adopt are establishing a sound laboratory management system handled by experienced personnel with a professional knowledge background and educating students on the operations and precautions of the laboratory to ensure their safety [11]. In addition, the equipment in the laboratory should be checked and maintained occasionally to ensure the accuracy of the experimental data.

#### **Publish competition information through official channels**

The promotion is a crucial aspect to promulgate throughout the university about the discipline competition, and however, with the widespread propagation of false information, the students can be deceived by such motives. Therefore, it is imperative to establish official channels to promote the competition. This can be done by designating a department or committee to collect and distribute the information across the colleges by utilizing websites or social media. For example, Shaoxing University established its website dedicated to competitions whereby the students and faculty can browse the relevant information about their interested category.

#### **Conclusion**

Discipline competitions motivate university students to grasp professional knowledge, apply it creatively in research practice, and integrate innovative thinking throughout disciplinary competitions. Moreover, the competitions enable the students to work towards a common goal with fellow students, form a team of mutual trust and cooperation, challenge through obstacles, and remain optimistic. As a result, scientific research literacy, creative thinking ability, practical operation ability, humanistic spirit cultivation, and team cooperation consciousness among university students are comprehensively enhanced during their participation in discipline competitions. Thus, it empowers the students to adapt efficiently to their future endeavors and enhances their social competitiveness. Furthermore, universities fully recognize and encourage the implementation of discipline competitions as they are indispensable and vital carriers of education and teaching reform.

However, the discipline competitions also revealed a few problems, such as low motivation for the student's participation, ineffective construction of instructors, and lack of incentive policies in universities. These can be corrected by highlighting the achievements of the participating teachers and students, restructuring the teams of instructors and students, and allocating funds for discipline competitions. Therefore, it can effectively improve the quality of the competitions, increase the participation of the teachers and students, and promote the overall improvement of students' comprehensive ability.

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