

Research on the Organization and Management Model of College Students' Science and Technology Competition Activities Based on Multidisciplinary Integration —Taking Industrial Design as an Example

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ABSTRACT

This paper focuses on the field of industrial design and explores the organization and management model of college students' science and technology competition activities based on multidisciplinary integration. By analyzing the current situation of design competitions in colleges and universities, this paper expounds the significance of multidisciplinary integration competitions and puts forward corresponding organizational and management strategies, aiming to improve the quality of competitions and cultivate innovative industrial design talents who meet the needs of the times. The research shows that the competition model of multidisciplinary integration can effectively integrate resources, stimulate students' innovative thinking and comprehensive abilities, and provide new ideas and methods for industrial design education.

Keywords: *Multidisciplinary integration, College students' competitions, Organization and management model, Industrial design.*

1. INTRODUCTION

Since domestic colleges and universities began to set up the "Industrial Design" major in the early 1980s, after more than 40 years of development, the number of domestic colleges and universities with design majors has increased from about 20 in the early days to nearly 1,000. This shows China's emphasis on design education and the huge demand for professional talents. Cultivating design talents who meet the needs of industrial development is an important issue that needs in-depth discussion in the current reform of design education[1]. In the current era of rapid scientific and technological development and continuous knowledge integration, the knowledge and skills of a single discipline can hardly meet the complex and changing social needs. As an important part of practical teaching in colleges and universities, college students' science and technology competitions are not only an effective way to test students' learning

achievements and enhance their practical abilities, but also an important platform to cultivate students' innovative thinking, teamwork ability and ability to solve practical problems, and they are an important component of practical teaching in Chinese colleges and universities.

Industrial design is a comprehensive discipline that integrates knowledge from multiple fields such as art, engineering, technology and economy. The connotation of industrial design continues to expand with the progress of science and technology and changes in market demand, which puts forward higher requirements for the comprehensive quality and interdisciplinary ability of designers. Therefore, it is of great practical significance to study the organization and management model of college students' science and technology competition activities based on multidisciplinary integration.

This study aims to deeply explore how to construct a scientific, reasonable and effective organizational and management model for

multidisciplinary integration competitions. Taking industrial design as an example, by integrating the advantageous resources of different disciplines, it stimulates students' innovative potential, improves the quality and effect of competitions, and provides useful references for cultivating innovative industrial design talents who meet the needs of the times.

2. CURRENT SITUATION OF DESIGN COMPETITIONS IN COLLEGES AND UNIVERSITIES

2.1 Aspects of Competition Organization and Management

At present, industrial design competitions in colleges and universities are facing some difficulties in organization and management. Some colleges and universities lack a clear competition organization structure, and the boundaries of responsibilities between departments are vague, which leads to the phenomenon of buck-passing in the competition organization process and affects the smooth progress of the competition. For example, in the preparation stage of the competition, poor communication and coordination among the publicity department, academic affairs department and colleges may lead to untimely and inaccurate transmission of competition information, reducing students' enthusiasm for participating in the competition.

At the same time, the lack of standardized competition procedures is also one of the common problems. Some colleges and universities lack clear standards and procedures in the registration, review and award-giving links of the competition, which easily leads to confusion and mistakes. For instance, unclear requirements and inadequate guidance in the registration stage may cause problems in the materials submitted by students.

2.2 Aspects of Participating Students and Teams

From the perspective of participating students, some students have a strong utilitarian purpose in participating in competitions. They pay too much attention to the awards and honors of the competition, while ignoring the improvement of their own abilities in the competition process. In order to win awards, some students choose competition projects that are easy to achieve results, and dare not try challenging and innovative projects.

In addition, students have shortcomings in interdisciplinary knowledge and skills, making it difficult for them to give full play to their best level in competitions involving multidisciplinary integration.

In terms of team formation, although some competitions encourage cross-major team formation, the actual effect is not ideal. There is a lack of effective communication and cooperation among team members, and it is difficult to form a strong joint force. For example, students from different majors have differences in knowledge background, way of thinking and work habits. If timely communication and coordination are not carried out, it is easy to cause internal conflicts within the team and affect the progress of the competition.

2.3 Aspects of Competition Resource Support

The lack of competition resource support is also an important factor restricting the development of design competitions in colleges and universities. In terms of the teaching staff, the scale and professional background of the guidance teachers cannot meet the competition needs of the participating teams. The professional background of some guidance teachers may not fully match the needs of the participating projects, and they lack interdisciplinary knowledge and experience, making it difficult for them to provide effective guidance. At the same time, there is also a problem with the stability of the guidance teaching staff. Some guidance teachers may not be able to provide continuous guidance to the participating teams due to personal reasons or work arrangements.

In terms of fund and venue support, some colleges and universities have insufficient investment in competition funds, which makes it difficult for participating teams to purchase materials, make prototypes and invite experts. In addition, the lack of competition venues also affects the development of the competition. Some teams can only carry out design and production in simple environments, which makes it impossible to give full play to their creativity and abilities.

3. SIGNIFICANCE OF MULTIDISCIPLINARY INTEGRATION COMPETITIONS

3.1 Enhancing Students' Comprehensive Abilities

The competition model of multidisciplinary integration can provide students with a comprehensive platform for learning and practice to help them improve their comprehensive abilities. In the competition process, students are required to use knowledge and methods from different disciplines to solve practical problems, which promotes students to continuously expand their knowledge scope and improve their abilities in the process of interdisciplinary learning and application. In industrial design competition projects, students not only need to master the basic principles and methods of design, but also need to understand the knowledge of related disciplines such as mechanical engineering, electronic engineering and material science, so as to achieve the unity of product functionality and aesthetics.

By working together with students from other majors, students can cultivate team spirit and communication skills, and thus learn the thinking modes and research methods of different disciplines. In the team, students from different majors can give full play to their respective advantages, learn from each other, inspire each other, and jointly complete the competition project[2]. This interdisciplinary cooperation experience will play a positive role in promoting students' future career development.

3.2 Promoting Disciplinary Integration and Innovation

The competition model of multidisciplinary integration is conducive to promoting the integration and innovation among various disciplines. In the competition process, the knowledge and methods of different disciplines collide and integrate with each other, which can stimulate new ideas and concepts and provide new ideas and directions for industrial design[3]. For example, combining artificial intelligence technology with industrial design can provide users with more convenient and efficient user experience, thus realizing the intelligence and personalization of products.

The competition model of multidisciplinary integration can also promote the development and

innovation of disciplines. Through competitions, experts and scholars from different disciplines can communicate and cooperate with each other, jointly discuss the cutting-edge issues and hot topics in discipline development, and provide new impetus and directions for the development of disciplines. At the same time, the excellent works and achievements emerging from the competition can also provide useful references for the teaching and scientific research of disciplines.

3.3 Adapting to Market Demands

With the progress of technology and the diversification of consumer demands, industrial design talents are increasingly in great demand in the market. Enterprises not only require designers to have solid professional knowledge and skills, but also need them to have an interdisciplinary perspective and innovative ability, so that they can provide competitive products and services for enterprises. The college students' science and technology competition activities based on multidisciplinary integration can cultivate high-quality industrial design talents who adapt to market demands.

By participating in multidisciplinary integration competition projects, students can better understand market demands and industry development trends, and their market sensitivity and competitiveness can also be improved. At the same time, the practical experience and innovative achievements obtained in the competition can also provide a strong backing for students' future employment and entrepreneurship.

4. STRATEGIES FOR MULTIDISCIPLINARY INTEGRATION

4.1 Optimizing the Talent Training Program

Colleges and universities should combine the characteristics of the industrial design major and market demands to optimize the talent training program and strengthen multidisciplinary integration. In terms of curriculum setting, the setting of interdisciplinary courses should break the conventional disciplinary boundaries and increase their proportion. For example, offer multiple interdisciplinary courses such as "Mechanical Design and Industrial Design", "Electronic Technology and Industrial Design" and "Material

Science and Industrial Design", which organically integrate the knowledge of related disciplines such as mechanical engineering, electronic engineering and material science with industrial design, so as to cultivate students' interdisciplinary thinking and comprehensive abilities [4].

While attaching importance to the practical teaching link, colleges and universities should strengthen school-enterprise cooperation and provide more practical opportunities for students. Through carrying out competition projects and internship training activities in cooperation with enterprises, students can learn and apply interdisciplinary knowledge in the actual work environment and improve their ability to solve practical problems.

4.2 Building an Interdisciplinary Teaching Team

Colleges and universities should build an interdisciplinary teaching team, integrate the teaching resources of different disciplines, and provide strong teaching support for multidisciplinary integration competitions. The teaching team should be composed of teachers with different disciplinary backgrounds, including teachers majoring in industrial design, mechanical engineering, electronic engineering, etc. Teachers should have interdisciplinary teaching ability and scientific research level, and master the knowledge and methods of different disciplines to guide students to solve practical problems.

At the same time, colleges and universities should improve the awareness and ability of cross-major teaching, and strengthen the training and communication of teaching staff. In order to encourage teachers to carry out interdisciplinary teaching research and scientific research cooperation and promote the communication and integration between different disciplines, colleges and universities should regularly organize teachers to participate in interdisciplinary academic seminars and training courses.

4.3 Establishing an Interdisciplinary Competition Platform

Colleges and universities should provide support and guarantee for multidisciplinary integration competitions, establish an interdisciplinary competition platform, and integrate the resources of different disciplines. The competition platform can include multiple functions

such as competition information release, project application, review management and achievement display. Students can timely understand competition information and register for competition projects through the competition platform; teachers can provide guidance for students in terms of project application and competition preparation; review experts can conduct online review work; competition results can be displayed and exchanged on the platform.

In addition, the competition platform can also connect with the R&D platforms and innovation centers of enterprises, introduce the actual projects and demands of enterprises, and provide students with competition projects that are more in line with the market. Through cooperation with enterprises, students can better understand enterprise demands and market trends in terms of practice and innovation.

4.4 Strengthening the Management of the Competition Process

Colleges and universities should strengthen the management of the competition process to ensure that the competition activities are fair, just and open. They should formulate detailed competition guidelines, clarify the competition process and rules, including the competition theme, participants, registration methods, work requirements and review standards. In the registration stage of the competition, strictly examine the qualification of participating students and their works to ensure that the participating works meet the registration requirements of the competition.

In the implementation stage of the competition, it is necessary to strengthen the guidance and supervision of the participating teams and ensure that all rules are strictly followed. Guidance teachers should communicate with students regularly, understand the progress of students' projects, and solve the problems encountered by students in a timely manner. At the same time, a competition progress tracking mechanism should be established to check the work progress of the participating teams regularly and ensure that the competition projects are completed on time.

In the review stage of the competition, a professional review team should be set up, and the review experts should have rich industry experience and interdisciplinary knowledge background. The review process should be carried out in strict accordance with the review standards to ensure that

the review results are fair and objective. After the review, the review results should be announced in a timely manner, and the award-winning works should be commended and rewarded.

4.5 Improving the Incentive Mechanism

In order to encourage students to actively participate in multidisciplinary integration science and technology competitions, colleges and universities should optimize the incentive mechanism. On the one hand, it is necessary to set up rich reward items, with emphasis not only on material rewards, but also on spiritual rewards and long-term rewards. Set up competition scholarships, honorary titles and innovative credits to commend and reward students who have performed well in the competition. On the other hand, the competition results should be linked to students' academic evaluation, postgraduate recommendation and employment, so as to improve students' attention to the competition.

A competition feedback mechanism should be established to collect the opinions and suggestions of participating students in a timely manner and understand the problems and difficulties encountered in the competition process. The competition organization and management model will be continuously improved and optimized according to the feedback from students, so as to continuously improve the quality and effect of the competition.

5. CONCLUSION

The research on the organization and management model of college students' science and technology competition activities based on multidisciplinary integration is of great practical significance. By optimizing the talent training program, building an interdisciplinary teaching team, establishing an interdisciplinary learning community and improving the incentive mechanism, the quality of competitions can be effectively improved, and innovative industrial design talents can be cultivated to meet the needs of the times.

In the future development, colleges and universities should further strengthen the construction of the organization and management model of multidisciplinary integration competitions and continuously improve the relevant systems and mechanisms. At the same time, they should provide a broader platform and richer resources for the competitions, strengthen cooperation with

enterprises and scientific research institutions, and integrate social resources. It is believed that with the joint efforts of all parties, the college students' science and technology competition activities based on multidisciplinary integration will play a more effective role in talent cultivation and contribute more to the development and innovation of China's industrial design field.

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