An Analysis of the Current Situation of Interdisciplinary Research in Applied Colleges and Universities and Its Operation Mechanisms

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Abstract: This paper explores the current situation of interdisciplinary research in applied universities and its operation mechanism. By combing the existing literature, we find that applied universities face some challenges in interdisciplinary research, such as the lack of effective cooperation platforms, disciplinary culture and institutional environment, as well as the imperfect evaluation and incentive mechanism of teachers. In order to solve these problems, we put forward some suggestions, such as establishing a cooperation platform, training interdisciplinary teachers, and improving evaluation and incentive mechanisms.

1. Introduction

With the increasing complexity and intersectionality of scientific research, interdisciplinary research has become an important way of innovative research and results transformation. As an important institution for cultivating high-quality applied talents, applied colleges and universities also face the challenge of how to carry out interdisciplinary research. The purpose of this paper is to explore the current situation of interdisciplinary research in applied universities and its operation mechanism, hoping to provide reference for related research and practice.

2. Importance and Significance of Interdisciplinary Research

Driven by globalization and societal demands, interdisciplinary research is receiving increasing attention in applied universities. Through comprehensive analysis of relevant literature and practical experience, we have discovered that establishing effective communication and collaboration mechanisms is crucial for advancing interdisciplinary research. The importance and significance of interdisciplinary research are reflected in several aspects: (1) Comprehensive problem-solving: Interdisciplinary research breaks down the boundaries of traditional disciplines and combines knowledge and methods from multiple fields, enabling better approaches to address and solve complex real-world problems. For example, tackling global challenges such as climate change, disease control, and sustainable development requires interdisciplinary collaboration and comprehensive research methods. (2) Stimulation of innovative thinking: Interdisciplinary research

promotes communication and collaboration among different disciplines, stimulating innovative thinking. By integrating perspectives and methodologies from different fields, new concepts, viewpoints, and solutions can be generated, offering fresh insights and breakthroughs for academic research and social innovation. (3) Cross-fertilization of knowledge and expansion of disciplinary boundaries: Interdisciplinary research facilitates cross-fertilization and integration among disciplines, breaking down the barriers between them and enabling the exchange and sharing of knowledge. This cross-fertilization and integration contribute to the emergence of new interdisciplinary fields, enriching the theoretical and practical foundations of disciplines. (4) Advancement of scientific frontiers: Interdisciplinary research often draws on knowledge and techniques from the cutting-edge areas of multiple disciplines, driving the progress of scientific research. This advance in scientific frontiers prompts the academic community to focus on broader issues, expand the scope and domains of research, and promote cross-disciplinary collaboration and innovation [1]. (5) Societal demands and problem-solving: Interdisciplinary research focuses on addressing practical problems and societal needs, aiming to provide solutions for society. It emphasizes the close connection between academic research and real-world issues, driving the integration of scientific research and societal practices, and making positive contributions to social development and progress. In summary, the importance and significance of interdisciplinary research lie in providing a collaborative approach across multiple disciplines to comprehensively address complex problems, stimulate innovative thinking, foster knowledge cross-fertilization and expansion of disciplinary boundaries, advance scientific frontiers, and serve societal needs. It not only enriches the depth of academic research but also offers profound insights and viable solutions for social development and problem-solving.

3. Existing Problems of Interdisciplinary Research in Applied Colleges and Universities

3.1. Lack of effective cooperation platforms

In the context of contemporary scientific research, interdisciplinary research has become an important pathway for innovative research and knowledge translation. However, for many applied universities, they often prioritize professional education and overlook the importance of interdisciplinary research. This emphasis on professional education has, to a certain extent, led to a lack of effective collaboration platforms for interdisciplinary research in applied universities. Firstly, the lack of shared laboratories is a major issue. In many applied universities, laboratory setups are usually based on individual disciplines, which restricts the use of laboratory equipment and resources to that particular discipline. Interdisciplinary research, on the other hand, requires access to experimental equipment across different disciplines, often leading to a reliance on laboratories that lack complete or crucial equipment. This situation limits the development of interdisciplinary research and affects the accuracy and reliability of research outcomes. Secondly, the lack of research equipment is also a significant factor limiting interdisciplinary research. In many applied universities, the procurement and allocation of research equipment usually align with the research needs of individual disciplines, with limited support for the requirements of interdisciplinary research. This makes it challenging for interdisciplinary researchers to obtain data and experimental results, thereby affecting the progress and outcomes of their research. Additionally, a shortage of research funding is another constraint on interdisciplinary research. In many applied universities, the allocation of research funds tends to favor projects within single disciplines, resulting in relatively limited support for interdisciplinary research. This funding allocation model makes it difficult for interdisciplinary research projects to obtain sufficient financial support, thus hindering the in-depth development and knowledge translation of the research.

3.2. Lack of disciplinary culture and institutional environment

In applied universities, the promotion of interdisciplinary research is constrained by disciplinary culture and institutional environment. Due to historical and developmental factors, applied universities often face disciplinary barriers and disciplinary centrism, which pose challenges to interdisciplinary research. Firstly, disciplinary barriers arise from the establishment and division of disciplines. Under the framework of traditional disciplinary divisions, there are significant differences in research content, methods, and techniques between different disciplines, requiring the crossing of disciplinary boundaries for interdisciplinary research. However, due to the influence of disciplinary centrism, teachers and researchers often focus more on research outcomes within their own disciplines, neglecting collaboration and communication with other disciplines. This situation increases the difficulty of interdisciplinary research collaboration and hampers the sharing of research resources and outcomes. Secondly, the lack of corresponding institutional environment also limits the promotion of interdisciplinary research. In many applied universities, the application, evaluation, and assessment of research projects are typically conducted on a single-discipline basis. In such an institutional environment, interdisciplinary research often struggles to receive support and recognition [2]. On one hand, the experts involved in project application and evaluation usually come from single disciplines, which may lead to biases in understanding and evaluation of interdisciplinary research. On the other hand, the outcomes of interdisciplinary research often face challenges in receiving fair evaluation under traditional assessment criteria, such as paper publications and patent applications.

3.3. Lack of teacher evaluation and incentive mechanisms

In applied universities, the evaluation and incentive mechanisms for teachers are typically based on the standards of traditional disciplines. These traditional evaluation and incentive mechanisms often prioritize the quantity and quality of academic achievements, such as paper publications, patent applications, and research projects. However, these evaluation and incentive mechanisms pose some challenges for interdisciplinary research. Firstly, the outcomes of interdisciplinary research often struggle to be recognized within the confines of the traditional evaluation system. Since the outcomes of interdisciplinary research often involve multiple disciplinary domains, their evaluation requires transcending the boundaries of different disciplines. Traditional evaluation mechanisms, however, tend to focus only on the achievements of individual disciplines, making it difficult to provide a fair assessment of interdisciplinary research. This may result in unfair treatment of teachers and teams engaged in interdisciplinary research within the evaluation and incentive mechanisms. Secondly, interdisciplinary research requires more resource support, including research funding, experimental equipment, and personnel allocation. However, under the traditional evaluation and incentive mechanisms, these resources are often inclined to support research projects within single disciplines, leading to a potential scarcity of resources for interdisciplinary research, this restricts the progress and quality of research for teachers and teams engaged in interdisciplinary research [3].

3.4. Lack of interdisciplinary training for students

In applied universities, the curriculum and training models often focus on the knowledge and skills of a single discipline, neglecting interdisciplinary development. This leads to a lack of interdisciplinary perspective and abilities among students, limiting their participation and contributions in interdisciplinary research. Firstly, the lack of interdisciplinary curriculum and training programs makes it difficult for students to acquire interdisciplinary knowledge and skills.

Traditional curriculum designs often prioritize the knowledge and skills of a single discipline while neglecting other subjects. This makes it challenging for students to integrate and apply knowledge and skills from different disciplines when dealing with interdisciplinary research. Without interdisciplinary knowledge and skills, students struggle to make valuable contributions in interdisciplinary research. Secondly, the lack of interdisciplinary practice opportunities and collaborative platforms restricts student involvement and contributions. In traditional training models, students typically engage in learning and research within the context of a single discipline's practice opportunities and collaborative platforms. This makes it difficult for students to effectively communicate and collaborate with students and faculty members from other disciplines, limiting their participation and contributions in interdisciplinary research. Additionally, the absence of interdisciplinary evaluation mechanisms affects student performance and achievements. Traditional evaluation mechanisms tend to focus solely on evaluation indicators of a single discipline, such as exam scores and academic papers. This makes it challenging to fairly evaluate and recognize students' performance and achievements in interdisciplinary research. Without interdisciplinary evaluation mechanisms, students struggle to receive effective motivation and feedback, which hinders their involvement and contributions in interdisciplinary research.

3.5. Lack of effective communication and cooperation mechanisms

In applied universities, the division and relative closedness of disciplines often restrict communication and collaboration among teachers and between teachers and students to within the confines of a single discipline. This makes interdisciplinary communication and collaboration difficult, hindering timely access to and sharing of the latest information and resources in interdisciplinary research. Firstly, the division and closedness of disciplines limit the communication and collaboration between teachers and students. Under traditional disciplinary divisions, teachers usually conduct research within a single discipline, resulting in a lack of experience and willingness to engage in interdisciplinary communication and collaboration. Additionally, due to differences and barriers between disciplines, teachers and students find it challenging to effectively communicate and collaborate across different subject areas. Secondly, the lack of interdisciplinary communication platforms and collaboration mechanisms also hampers the progress and effectiveness of interdisciplinary research. Many applied universities lack dedicated platforms and mechanisms for interdisciplinary communication and collaboration, such as interdisciplinary seminars, forums, and laboratories. This makes it difficult for teachers and students to access and share the latest information and resources in interdisciplinary research, affecting the progress and quality of research. Additionally, the lack of interdisciplinary research projects and funding support further limits the development of interdisciplinary communication and collaboration. In traditional research projects, the focus is often on research problems within a single disciplinary field, neglecting the needs and support for interdisciplinary research. This makes it challenging for interdisciplinary research projects to secure sufficient funding support, thereby limiting the level of participation and contribution of teachers and students in interdisciplinary communication and collaboration.

4. Countermeasures to the Problems

4.1. Establishment of a cooperation platform

Establishing collaboration platforms is an important means for applied universities to promote interdisciplinary research. By establishing shared laboratories, research equipment, and research funding platforms, the problem of resource scarcity in interdisciplinary research can be addressed,

thereby improving research efficiency and the translation of research outcomes. Firstly, establishing shared laboratories can facilitate communication and collaboration among different disciplines. Shared laboratories provide experimental equipment and facilities for interdisciplinary research, enabling teachers and researchers from different disciplines to jointly utilize laboratory resources and conduct interdisciplinary experiments and research discoveries. This not only enhances the utilization of laboratory resources but also promotes communication and collaboration among different disciplines, further advancing interdisciplinary research progress and the translation of research outcomes. Secondly, providing research equipment is a crucial measure to support interdisciplinary research. In interdisciplinary research, a variety of research equipment is often required for experiments and observations, such as physics experiments, chemical analysis, and biological testing. By providing research equipment, the needs of interdisciplinary research can be met, enabling teachers and researchers to conduct experiments and observations more effectively, thereby improving the accuracy and reliability of research. Moreover, providing research funding is an important guarantee to support interdisciplinary research. Substantial funding is often required for experiments, observations, personnel training, and other aspects of interdisciplinary research. By providing research funding, the development and translation of interdisciplinary research can be supported, encouraging teachers and researchers to invest more time and resources into interdisciplinary research. Overall, establishing collaboration platforms, including shared laboratories, research equipment, and research funding, plays a critical role in promoting interdisciplinary research in applied universities.

To establish effective collaboration platforms, the following measures need to be taken:

Firstly, it is essential to develop a reasonable platform construction plan. The construction of collaboration platforms should consider the needs and characteristics of different disciplines, and formulate a rational planning scheme. It is crucial to clarify the positioning, goals, and content of the platforms to ensure their sustainable development [4].

Secondly, interdisciplinary research teams should be established. By forming interdisciplinary research teams, communication and collaboration among different disciplines can be promoted, enabling synergistic innovation in interdisciplinary research. The research teams can include teachers and researchers from different disciplines working together on interdisciplinary research projects.

Simultaneously, a platform management and operation mechanism should be established. Collaboration platforms need to have a scientific management and operation mechanism in place to ensure their normal functioning and development. Clear management institutions and systems should be established, along with well-defined resource allocation and reward mechanisms, to enhance the operational efficiency and service quality of the platforms.

Additionally, cooperation and exchanges with other universities, research institutions, and enterprises should be strengthened. By collaborating and exchanging with other universities, research institutions, and enterprises, resource sharing and complementation can be achieved, enhancing the level and efficiency of interdisciplinary research. Joint research projects, shared laboratories, and equipment sharing can be implemented to strengthen cooperation and exchanges between different institutions.

In summary, implementing these measures will contribute to the establishment of effective collaboration platforms in support of interdisciplinary research.

4.2. Preparation of interdisciplinary teachers

Cultivating interdisciplinary teachers is a key component in advancing interdisciplinary research at applied universities. By offering interdisciplinary training and professional development

programs, it is possible to enhance teachers' awareness and capabilities in interdisciplinary studies, and cultivate a group of teachers with interdisciplinary perspectives and abilities. This, in turn, promotes the development and translation of interdisciplinary research outcomes. Firstly, conducting interdisciplinary training can enhance teachers' interdisciplinary knowledge and skills. The training content can cover various subjects and skills such as interdisciplinary curriculum, research methodologies, and data analysis. Through training, teachers can gain knowledge of the cutting-edge trends and technical approaches in different disciplines, improve their own interdisciplinary knowledge and skills, and actively participate in and drive interdisciplinary research. Secondly, conducting interdisciplinary professional development programs can facilitate teachers' interdisciplinary communication and collaboration. These programs provide teachers with opportunities to interact and collaborate with teachers and researchers from other disciplines. Through collaborative research, discussions, and experience sharing, teachers deepen their understanding and capabilities in interdisciplinary research. By engaging in interdisciplinary professional development programs, teachers can establish collaborative relationships across disciplines and jointly conduct interdisciplinary research projects, thus advancing interdisciplinary research and its translation. Furthermore, cultivating interdisciplinary teachers requires a focus on fostering their innovation and practical abilities. In training and professional development programs, emphasis should be placed on nurturing teachers' innovative thinking and practical skills, encouraging them to apply interdisciplinary knowledge to practical problem-solving and innovative practices. Through practical experience and innovation, teachers can better leverage their professional strengths and promote the innovation and development of interdisciplinary research. Moreover, establishing interdisciplinary teacher teams can facilitate the advancement of interdisciplinary research. By forming interdisciplinary teacher teams, complementary strengths and collaborative innovation between different disciplines can be achieved. Teacher teams can collaboratively develop interdisciplinary research plans, carry out research projects, and mentor graduate students, thereby enhancing the quality and efficiency of interdisciplinary research.

4.3. Improve evaluation and incentive mechanisms

Improving evaluation and incentive mechanisms is an important measure to promote interdisciplinary research in applied universities. By establishing evaluation criteria and incentive mechanisms specifically tailored to interdisciplinary research, we can recognize and reward interdisciplinary research achievements, thereby enhancing teachers' motivation and creativity in participating in interdisciplinary research. Firstly, it is necessary to establish a scientific evaluation system for interdisciplinary research achievements. The evaluation system should take into account the characteristics and needs of interdisciplinary research, focusing not only on the academic value of research outcomes but also on their practical application and social benefits. Evaluation criteria can include the novelty of research questions, the innovation of research methods, and the practicality of research outcomes, ensuring a comprehensive and scientific evaluation of interdisciplinary research achievements. Secondly, it is important to establish reasonable incentive mechanisms to reward interdisciplinary research achievements. Incentive measures can include research project funding, academic achievement awards, and promotion opportunities, encouraging teachers to invest more energy and resources into interdisciplinary research. Meanwhile, special awards for interdisciplinary research can be established to recognize and reward teachers and researchers who have made outstanding contributions in the field of interdisciplinary research, thereby stimulating their creativity and innovative spirit. Furthermore, it is necessary to reform the evaluation and incentive mechanisms for teachers, incorporating interdisciplinary research into assessment and evaluation indicators. Teacher evaluations should shift from evaluations solely

based on a single discipline to evaluations with a focus on teachers' interdisciplinary research capabilities and achievements. By increasing the weight of interdisciplinary research in the evaluation indicators, teachers are encouraged to participate in interdisciplinary research projects, thereby enhancing their motivation and creativity in this field. Additionally, emphasis should be placed on cultivating teachers' interdisciplinary research capabilities and qualities. Through the implementation of interdisciplinary training and professional development programs, teachers' interdisciplinary awareness and abilities can be enhanced, and their innovative thinking and practical skills can be nurtured. At the same time, attention should be given to selecting and training teachers with interdisciplinary perspectives and abilities, creating a team of teachers with the capabilities and qualities required for interdisciplinary research.

4.4. Enhance interdisciplinary training of students

Strengthening interdisciplinary education for students is a necessary measure to promote interdisciplinary research in applied universities. By optimizing curriculum design and cultivation models, with a focus on developing students' interdisciplinary skills and perspectives, a solid foundation can be laid for their participation in interdisciplinary research and the delivery of outstanding talents to the field. Firstly, it is necessary to reform curriculum design by incorporating interdisciplinary courses and practical projects. Introducing interdisciplinary courses, such as elective courses in cross-disciplinary subjects and interdisciplinary seminars, enriches students' knowledge structure and enhances their interdisciplinary perspectives and abilities. Likewise, implementing interdisciplinary practical projects, such as research training and innovation and entrepreneurship programs, encourages students to apply theoretical knowledge to practical problem-solving, nurturing their interdisciplinary practical capabilities and innovative spirit. Secondly, it is important to cultivate students' interdisciplinary thinking and abilities. Within the cultivation model, emphasis should be placed on fostering students' innovative thinking and abilities. This can be achieved by establishing innovation laboratories, organizing innovation competitions, and other activities that inspire students' innovative potential and participation enthusiasm. Additionally, cultivating students' teamwork and collaboration skills is crucial. Encouraging students to leverage their strengths within interdisciplinary teams enhances their involvement and contribution to interdisciplinary research. Furthermore, establishing a team of interdisciplinary mentors is essential to provide comprehensive guidance for students. The team can consist of teachers and researchers from different disciplines who collectively guide students in interdisciplinary research, offering comprehensive mentoring and support. Through the guidance of interdisciplinary mentors, students gain a better understanding of knowledge and skills across different disciplines, enhancing their interdisciplinary research capabilities and qualities. Moreover, actively promoting interdisciplinary exchanges and collaborations provides students with more opportunities and resources. Organizing interdisciplinary academic seminars, arranging for students to participate in interdisciplinary competitions, and other activities broaden students' horizons while enhancing their communication and collaboration abilities. Collaboration and exchanges with other universities, businesses, and social institutions can also provide students with more practical opportunities and resource support, thereby fostering interdisciplinary research and the translation of its outcomes.

4.5. Establishment of effective communication and cooperation mechanisms

Establishing effective communication and collaboration mechanisms is a key aspect of advancing interdisciplinary research in applied universities. By breaking down disciplinary barriers and strengthening communication and collaboration between faculty and students, it is possible to

facilitate exchange and cooperation across different disciplinary fields and create interdisciplinary cooperation networks and resource-sharing platforms. Firstly, academic lectures and seminars can be organized to promote exchange and collaboration among different disciplinary fields. These events can invite domestic and international experts and scholars to deliver theme reports and engage in discussions, introducing the latest interdisciplinary research findings and technical methods to inspire innovative thinking and research inspiration among faculty and students. Additionally, interdisciplinary academic seminars can be organized within the university to encourage teachers and students to communicate and collaborate across disciplinary boundaries, fostering knowledge sharing and collaborative innovation. Secondly, team projects can be carried out to facilitate communication and collaboration between faculty and students. These team projects can involve teachers and students from different disciplines, who work together to complete interdisciplinary research tasks, fostering teamwork and interdisciplinary research abilities among faculty and students. In team projects, students can acquire knowledge and skills from different disciplines and broaden their horizons and interpersonal relationships through cooperative exchange with their classmates. Furthermore, establishing interdisciplinary collaboration networks and resource-sharing platforms is crucial. Collaboration networks can include interdisciplinary research institutions, laboratories, and technology centers both within and outside the university, which can share and complement resources through establishing cooperative relationships. Resource-sharing platforms can encompass shared databases, experimental equipment, and technical tools, which can enhance the efficiency of interdisciplinary research and facilitate the translation of research outcomes. Additionally, active international exchanges and collaborations can be pursued to introduce advanced interdisciplinary research ideas and technical methods from abroad. By establishing cooperative relationships with foreign universities and research institutions, interdisciplinary joint research and academic exchanges can be conducted to introduce advanced interdisciplinary research concepts and techniques, thereby elevating the level and influence of interdisciplinary research [5].

5. Conclusion

In this article, we have explored the current situation and operational mechanisms of interdisciplinary research in applied universities. We have come to understand that interdisciplinary research has become increasingly important in applied universities under the driving forces of globalization and societal needs. The establishment of effective communication and cooperation mechanisms is crucial for advancing interdisciplinary research. The importance and significance of interdisciplinary research can be seen from several aspects. It enables a comprehensive approach to solving complex problems, breaking down disciplinary boundaries, and providing better solutions to real-world issues. It also stimulates innovative thinking, promotes communication and collaboration between different disciplines, and generates new concepts and solutions. Interdisciplinary research further facilitates cross-disciplinary integration, enriches the theoretical and practical foundations of disciplines, advances the frontiers of scientific research, and encourages academia to focus on broader issues, fostering cross-disciplinary collaboration and innovation. Most importantly, interdisciplinary research addresses societal needs and problem-solving, making positive contributions to social development and progress. To promote the development of interdisciplinary research in applied universities, we propose several methods and mechanisms, such as establishing effective communication platforms, fostering faculty-student cooperation, constructing collaborative networks and resource-sharing platforms, and strengthening international exchanges and collaborations. These measures contribute to enhancing the quality and impact of interdisciplinary research, providing beneficial references and guidance for higher

education institutions and research administrators. However, we also recognize the challenges faced by interdisciplinary research, such as disciplinary barriers and limitations in cooperation mechanisms. Therefore, we encourage applied universities to strengthen support and management for interdisciplinary research, providing better resources and environments, and motivating faculty and staff to actively engage in interdisciplinary collaboration. Through our analysis of the current situation and operational mechanisms of interdisciplinary research in applied universities, we believe that interdisciplinary research will bring new opportunities and developments to higher education and scientific research, making greater contributions to solving complex problems and driving social progress. We hope that the findings of this article will provide valuable references for scholars and administrators in relevant fields, and further promote the development and innovation of interdisciplinary research in applied universities.

Acknowledgements

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