Research on Organizational Barriers and Transformation Strategies in the Integration of Teaching and Research at Universities in Shandong Province

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Abstract. This study focuses on the organizational barriers encountered during the integration of teaching and research (T&R) at universities in Shandong Province, revealing key issues in areas such as management systems, cultural perceptions, resource allocation, and policy environment. It proposes transformation strategies to promote deep integration of T&R through optimizing organizational structures, transforming culture and perceptions, enhancing resource allocation, improving policy support, and fostering an enabling environment. The study recommends that the government increase investment and improve policies, universities optimize management and innovate culture. The aim of this research is to provide strategic guidance for the integration of T&R at universities in Shandong Province, promoting the improvement of higher education quality and the enhancement of scientific research innovation capabilities, thereby contributing to the development of higher education.

Keywords: Integration of Teaching and Research, Organizational Barriers, Transformation Strategies, Universities in Shandong

1 Introduction

In the context of today's rapidly evolving global knowledge economy and technological innovation, the integration of teaching and research (T&R) has become a critical pathway for enhancing the quality of higher education and boosting innovation capabilities, attracting increasing attention from governments and educational institutions worldwide[1]. The integration of T&R not only emphasizes the mutual penetration and promotion between teaching and research but also advocates a virtuous cycle where research drives teaching and teaching enhances research. This approach aims to cultivate students' innovative spirit and practical skills while improving the overall quality of faculty and the comprehensive competitiveness of institutions[2]. For Shandong Province, a major economic and educational powerhouse on China's eastern coast, its higher education system bears the significant responsibility of providing talent and intellectual support for regional socioeconomic development. Therefore, deepening the integration

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of T&R and promoting the connotative development of higher education is of immeasurable strategic importance for Shandong in achieving the transition of old and new growth drivers and advancing high-quality economic development. This study aims to delve into the organizational barriers faced by universities in Shandong Province during the integration of T&R and to propose targeted transformation strategies through systematic analysis.

2 The Current Status of T&R Integration at Universities in Shandong Province

2.1 Overview of T&R Integration

T&R integration, as a new model for the development of higher education, refers to the close combination of scientific research and teaching activities[3]. This integration involves using research activities to update teaching content and leveraging teaching outcomes to enhance research standards. It emphasizes that research and teaching are not isolated domains but rather complementary and mutually reinforcing organic wholes[4]. T&R integration not only stimulates students' interest in learning and fosters innovative thinking, thereby improving teaching quality, but also accelerates the rapid conversion and application of research results, enhancing the scientific research and innovation capabilities of universities[5]. Specifically, T&R integration helps to build a student-centered teaching model. By participating in research projects and laboratory teaching, students can learn through practice and innovate while learning. Additionally, it encourages teachers to integrate the latest research findings into classroom instruction, ensuring that teaching content remains up-to-date and relevant, maintaining its cutting-edge and practical nature.

2.2 Practices of T&R Integration at Universities in Shandong Province

As a major educational province, Shandong has been committed to promoting the connotative development of higher education, with the integration of T&R serving as a key component in enhancing educational quality. The following two sections provide a brief analysis of the current status and distinctive projects of T&R integration at representative universities.

Shandong University: Shandong University has established interdisciplinary research platforms, such as the "Shandong University-Qilu Medical Science Center," which promotes the cross-disciplinary integration of medicine, life sciences, and natural sciences. Additionally, the university has implemented a "Mentor System for Undergraduates," encouraging early student participation in research, which effectively enhances students' research literacy and innovation capabilities.

Ocean University of China: Leveraging its strengths in marine science, Ocean University of China has developed an "Integrated Innovation System for Marine Science and Education." By setting up marine science innovation platforms and talent training

bases, the university has achieved deep integration between marine research and teaching, cultivating a large number of marine technology professionals with international perspectives.

3 Analysis of Organizational Barriers

3.1 Organizational Structure Barriers

Universities, as the primary vehicles for the integration of T&R, have internal management systems, departmental settings, and disciplinary layouts that directly impact the effectiveness of T&R integration. In some universities in Shandong Province, organizational structure barriers are mainly manifested in the following aspects.

Rigid Internal Management Systems: Traditional hierarchical management structures lead to low decision-making efficiency and inadequate rapid response capabilities for T&R integration projects. Poor communication and the lack of coordination mechanisms among departments make it difficult to form a cohesive force to advance T&R integration.

Departmental Silos: Clear boundaries exist between departments, and there is a lack of effective mechanisms for interdisciplinary collaboration. This results in the segregation of research and teaching resources, limiting the conversion of research outcomes into teaching content.

Severe Disciplinary Barriers: The barriers and competition between disciplines outweigh cooperation, hindering the formation of interdisciplinary research teams and joint applications for research projects. This restricts the depth and breadth of T&R integration.

3.2 Cultural and Conceptual Barriers

Cultural and conceptual barriers are deep-seated issues in the process of integrating T&R. These barriers are primarily reflected in the following areas.

Entrenched Traditional Educational Concepts: A teaching model dominated by knowledge transmission remains prevalent, neglecting the cultivation of students' innovative abilities and practical skills. This hinders the deep advancement of T&R integration.

Single-Dimensional Academic Evaluation System: There is an overemphasis on the quantity of published papers and journal impact factors, while the social contributions of teaching and research outcomes are overlooked. This leads to a separation between teaching and research, reducing the motivation for T&R integration among teachers.

Fixed Role Perception of Teachers: Some teachers define themselves solely as researchers or instructors, lacking awareness of T&R integration. They are unwilling or unable to effectively incorporate research findings into the teaching process.

3.3 Resource Allocation Barriers

The rationality and effectiveness of resource allocation are crucial for the success of T&R integration. However, in practice, the following issues often arise.

Uneven Funding Distribution: Research funds and teaching funds are often managed separately, with research funds predominantly allocated to projects that already have some achievements. This results in insufficient support for T&R integration projects.

Unreasonable Human Resource Allocation: The allocation of teachers and researchers is often based on disciplines or departments rather than the needs of T&R integration projects. This makes it difficult to form project teams and leads to a waste of human resources.

Lagging Information Sharing Platform Construction: The lack of a unified platform for sharing research and teaching information results in poor sharing of research data and teaching resources, affecting the efficiency and quality of T&R integration.

3.4 Policy and Environmental Barriers

The external policy environment has a significant impact on the integration of T&R, and the main issues are as following.

Unclear Policy Guidance: While the national level encourages T&R integration, specific policy support and incentive measures are not sufficiently clear. The implementation and effectiveness of policies at the local level also vary.

Insufficient Social Support: There is a lack of awareness and recognition of T&R integration in society. The low acknowledgment and support for the outcomes of T&R integration at universities affect its social influence and resource acquisition.

Limitations on International Cooperation and Exchange: Changes in the international political and economic environment, along with restrictions on certain international cooperation projects, have impacted the exchange and cooperation between universities in Shandong Province and advanced international educational resources. This limits the international perspective and level of T&R integration.

4 Transformation Strategies

4.1 Optimization of Organizational Structure

Promoting Flattened Management: Simplify management levels to improve decision-making efficiency and enhance the organization's ability to respond quickly to T&R integration projects. Establish cross-departmental collaboration mechanisms to ensure the effective integration and sharing of research and teaching resources.

Building Interdisciplinary Platforms: Set up interdisciplinary research centers or innovation laboratories to break down disciplinary barriers and promote cross-disciplinary integration. Use project-driven approaches to form interdisciplinary research teams that jointly undertake research and teaching tasks.

Flexible Organizational Adjustment Mechanisms: Adjust departmental settings and resource allocation flexibly according to the needs of T&R integration projects, ensuring the optimal allocation and efficient use of resources. Establish a regular evaluation mechanism to dynamically adjust organizational structures to adapt to new requirements for T&R integration.

4.2 Transformation of Culture and Mindset

Advocating a Student-Centered Teaching Philosophy: Make the cultivation of students' innovative and practical abilities the core goal of teaching. Encourage students to participate in research projects to achieve an organic integration of research and teaching.

Establishing an Innovation-Encouraging Academic Culture: Reform the academic evaluation system to value not only traditional research publications but also the social contributions and innovative value of teaching and research outcomes. Set up innovation reward funds to motivate innovative activities among teachers and students.

Promoting Teacher Role Transition: Encourage teachers to take on both research and teaching responsibilities, becoming facilitators of T&R integration. Provide training and professional development opportunities to help teachers master T&R integration teaching methods and techniques, enhancing their overall competence.

4.3 Optimization of Resource Allocation

Diversified Funding Sources: In addition to government grants, actively seek funding from corporate sponsorships, social donations, and international cooperation to provide adequate financial support for T&R integration projects. Establish risk investment funds to support research projects with innovative potential.

Rational Allocation of Human Resources: Flexibly allocate teachers and researchers based on the needs of T&R integration projects. Develop a talent-sharing mechanism that allows teachers to hold part-time positions in different departments or research centers, promoting talent mobility and collaboration.

Enhancing Information Technology Infrastructure: Build a unified platform for sharing research and teaching information to ensure the effective sharing of research data and teaching resources. Utilize big data and artificial intelligence technologies to improve the efficiency and quality of T&R integration.

4.4 Policy Support and Environment Creation

Improving Policy Support Systems: Develop specific policies for T&R integration, clearly outlining support measures and incentive mechanisms. Establish an evaluation mechanism for T&R integration projects to recognize and reward outstanding initiatives.

Strengthening University-Enterprise Collaboration: Build close partnerships with enterprises to jointly undertake research projects and promote the conversion and application of research outcomes. Establish internship and training bases to provide students with practical opportunities, enhancing their employability.

Promoting International Exchange and Cooperation: Strengthen collaborations with internationally renowned universities and research institutions to introduce advanced educational resources and teaching methods. Encourage teachers and students to participate in international academic exchange activities to broaden their international perspectives.

4.5 Implementation Pathways and Assurance Measures

Designing Implementation Steps: Define the goals and timelines for T&R integration reforms, and develop specific implementation steps and action plans. Establish a project responsibility system to ensure that all tasks are effectively carried out.

Establishing Supervision and Evaluation Mechanisms: Set up a dedicated supervision and evaluation agency to conduct regular assessments and oversight of T&R integration projects. Establish a feedback mechanism to promptly collect and address issues and suggestions that arise during project implementation.

Strengthening Assurance Measures: Provide necessary financial, human, and material support to ensure the smooth implementation of T&R integration reforms. Enhance publicity and guidance to create a positive public opinion environment, increasing the recognition and participation of faculty and students in T&R integration reforms.

5 Recommendations

5.1 Recommendations for Government Departments

Improve Policy Systems: Formulate or revise relevant policies to clarify the goals, tasks, and support measures for T&R integration, providing policy guidance and support to universities.

Increase Investment: Increase fiscal investment in T&R integration projects, establish special funds, and encourage private capital participation to create a diversified funding mechanism.

Promote University-Enterprise Cooperation: Build platforms for university-enterprise collaboration to promote the deep integration of industry, academia, research, and application, facilitating the conversion and application of research outcomes.

5.2 Recommendations for Universities

Optimize Internal Management: Implement flattened management, construct interdisciplinary platforms, and establish flexible organizational adjustment mechanisms to improve management efficiency and resource utilization.

Reform Culture and Mindset: Advocate a student-centered teaching philosophy, establish an innovation-encouraging academic culture, and promote the transformation of teacher roles to foster a positive environment for T&R integration.

Strengthen Resource Allocation: Reasonably allocate human, material, and financial resources, enhance information technology infrastructure, and improve the efficiency and quality of T&R integration.

6 Conclusion

This study focuses on the organizational barriers and transformation strategies in the integration of teaching and research (T&R) at universities in Shandong Province. Through in-depth analysis, it reveals the significant role of T&R integration in enhancing the quality of higher education and research innovation capabilities, while also identifying the key organizational barriers currently in place. Based on this analysis, a series of transformation strategies are proposed. These strategies aim to break down barriers, promote the deep integration of research and teaching, and enhance the overall competitiveness and social contribution of universities in Shandong Province.

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References

1. Li L .Exploration and thinking on the integration of teaching management and teaching and research in colleges[J].Curriculum and Teaching Methodology, 2023. DOI:10.23977/curtm.2023.060201.
2. Cao Y, Postareff L, Lindblom-Ylänne S, et al. A survey research on Finnish teacher educators’ research-teaching integration and its relationship with their approaches to teaching[J]. European journal of Teacher education, 2023, 46(1): 171-198.
3. Zhan W, Hur B, Ryoo B Y. A Case Study for Integration of Teaching and Research in an Engineering Technology Program[J]. Journal of Engineering Technology, 2022, 39(1):39.
4. Griggs L. Comment: The integration of teaching and research in higher education[J]. Herdsa News, 2005, 25(3): 1-3.
5. Yang M. Enhancing the integration between teaching and research in sustainability subjects[M]//Handbook on Teaching and Learning in Operations Management. Edward Elgar Publishing, 2024: 372-389.