Research on the Reciprocal University-Enterprise Cooperation Model Based on Industry-Education Integration

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Abstract. This paper focuses on the Electrical Engineering program at Tibet Agriculture and Animal Husbandry College, proposing and analyzing a reciprocal university-enterprise cooperation model based on industry-education integration. The study explores the implementation of this model in applied universities by examining the institution's practice in university-enterprise collaboration. The research concentrates on the clean energy sector and systematically outlines the roles and responsibilities of the government, enterprises, and universities in industry-education integration through literature review and case analysis. The findings indicate that government policy support, deep enterprise involvement, and university teaching reforms are key factors driving industry-education integration. The proposed reciprocal cooperation model significantly enhances the quality of talent training, promotes technological innovation in the clean energy field, and provides important reference for industry-education integration practices in universities in Tibet and other regions.

Keywords: industry-education integration; reciprocal cooperation; university-enterprise collaboration; clean energy

1 Introduction

With the advancement of higher education reforms in China, industry-education integration has become an essential strategy for improving the quality of talent cultivation in universities. Tibet's unique geographical and economic conditions present significant challenges to educational development, including insufficient faculty resources, uneven distribution of educational resources, and harsh teaching environments. However, Tibet possesses distinct advantages in sectors like clean energy. By effectively utilizing these resources, coupled with government policy support and increased investment in education, the region can address these challenges and gradually advance educational development, improving the quality of talent cultivation.

R. Koul et al. (eds.), *Proceedings of the 2nd International Conference on Educational Development and Social Sciences (EDSS 2025)*, Advances in Social Science, Education and Humanities Research 924,
https://doi.org/10.2991/978-2-38476-400-6_75

In an effort to better serve the local economy, particularly the clean energy industry, Tibet Agriculture and Animal Husbandry College has developed an industry-education integration model based on deep collaboration with enterprises. However, the current model faces notable issues such as low enterprise participation, a singular cooperation approach, and insufficient university-enterprise interaction. These problems highlight the urgent need for optimization to achieve more effective industry-education integration.

Internationally, industry-education integration has become more mature, with various cooperation models in countries such as the United States, Singapore, Australia, and Germany offering valuable theoretical and practical insights [1-4]. In these countries, enterprise involvement is deeply embedded in educational systems, fostering collaboration that aligns with industry needs. Domestically, since the 18th National Congress of the Communist Party of China, there has been a growing emphasis on cooperative education and competency-based education. School-enterprise cooperation should be based on mutual benefit and coexistence, where complementary advantages are achieved among multiple stakeholders, including the government, enterprises, and universities [5]. While some progress has been made in both domestic and international contexts, existing research often focuses on macro-level policies, with insufficient attention given to the specifics of interaction and diverse cooperation paths.

Industry-education integration is a systematic project that should be promoted collaboratively from the perspectives of the regional industrial subsystem, higher education subsystem, industry-education complex system, and external environment to continuously enhance the performance level [6]. Industry-education integration and collaborative innovation play a pivotal role in talent development, enterprise innovation, and industrial progress [7]. The game between the interest subjects of the integration of industry and education refers to the process in which the interest subjects contribute to their own behavior according to their information and ability cognition under certain institutional conditions [8]. Reciprocators promote mutually beneficial actions by increasing the return for beneficial behaviors and decreasing the return for detrimental behaviors, guiding other agents towards cooperation without differentiating through a model [9]. The findings suggest that reciprocal-teaching significantly enhances students' achievement in difficult Basic Science and Technology concepts [10].

This study aims to systematically analyze the school-enterprise cooperation model at Tibet Agriculture and Animal Husbandry College. It will explore the roles of government, enterprises, and universities in talent cultivation and technological innovation, proposing an optimization path for better integration. Based on the principle of mutual cooperation, the research will offer practical recommendations to strengthen the effectiveness of industry-education integration. These recommendations will not only provide a theoretical framework for the reform of higher education in Tibet but also offer practical guidance for local economic development, particularly in the clean energy sector. The study flowchart is shown in Figure 1. This research will propose an optimization path based on the principle of mutual cooperation, providing references for higher education reform in Tibet and local economic development.

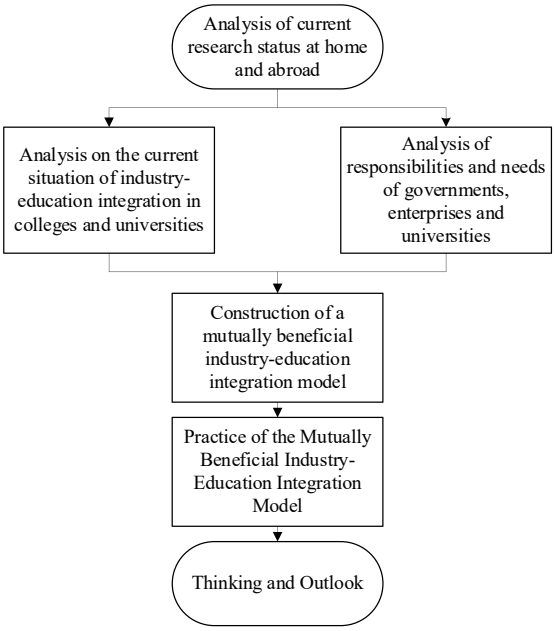

Fig. 1. Study flow chart

2 Analysis of the Current Status of Industry-Education Integration in Universities

The College of Electrical Engineering at Tibet Agriculture and Animal Husbandry University has made progress in industry-education integration, but its development remains limited due to objective constraints. The integration primarily depends on government support and minimal enterprise participation, with existing cooperation models being simplistic and lacking depth, especially in the clean energy sector. This issue arises from inadequate enterprise incentives, limited school resources, and poor communication between institutions and enterprises.

The government plays a key role by providing policy support and financial incentives. However, the implementation of policies such as tax incentives and subsidies needs improvement. Enterprises lack clear return mechanisms, reducing their willingness to participate. Strengthening policy enforcement and refining incentives are necessary to increase enterprise involvement.

Enterprises are crucial to the success of industry-education integration. However, low participation, especially in clean energy, is due to weak cooperation frameworks and unclear benefits. A clear cooperation framework with benefit-sharing mechanisms can encourage deeper enterprise involvement. Additionally, inviting industry experts to directly participate in teaching can enhance students' practical skills.

The college faces challenges in course design and practical teaching due to resource limitations. Strengthening communication with enterprises and aligning curricula with

industry needs is essential to improve students' practical abilities and better prepare them for the workforce. A coordinated approach involving government support, enterprise engagement, and curriculum reform is crucial for the success of industry-education integration.

3 Construction and Practice of a Mutually Beneficial Industry-Education Integration Model

The mutually beneficial industry-education integration model is based on cooperative game theory, systems theory, and social exchange theory. Cooperative game theory emphasizes achieving maximized benefits through collaborative cooperation to ensure the sustainability of partnerships; systems theory views industry-education integration as a collaborative system engineering; social exchange theory states that cooperation should be mutually beneficial, and fair and reasonable benefit distribution is essential for promoting the sustainable development of school-enterprise cooperation. This theoretical framework provides foundational support for the mutually beneficial industry-education integration model, clarifying its implementation path and strategies. The theoretical and model structures are shown in Figures 2-3.

3.1 Building the Mutually Beneficial Cooperation Model

The government plays a crucial role in promoting industry-education integration by implementing incentive policies such as tax benefits and subsidies, while establishing effective evaluation systems to ensure successful policy execution. Financial investments should prioritize sectors aligned with regional economic strategies to attract more enterprises and improve cooperation quality.

Industry-education integration aims to cultivate talent aligned with industry needs. Schools should collaborate with enterprises in developing curricula that reflect technical demands, market trends, and job skill standards, thereby enhancing students' practical skills and aligning course content with industry requirements.

Practical training is central to industry-education integration. Schools and enterprises should jointly establish teaching bases, with enterprise experts contributing to teaching, providing students with real-world experience and exposure to cutting-edge industry practices.

Effective information sharing and resource integration between schools, enterprises, and the government are vital for optimizing cooperation and achieving successful outcomes in industry-education integration.

3.2 Model Implementation and Optimization

Effective policy execution and supervision are essential for the successful implementation of industry-education integration. The government should establish a comprehensive supervision system and regularly evaluate cooperation outcomes to ensure proper

fund utilization and optimize policies based on feedback. It should also adjust funding directions as needed to support the deep advancement of school-enterprise cooperation.

Enterprise involvement is key to successful integration. Universities should deeply understand enterprise needs and adjust cooperation strategies accordingly to enhance students' professional and practical skills. School-enterprise partnerships should also meet enterprises' technological innovation needs, improving collaboration quality through mutual technical cooperation and talent development.

Building long-term, stable cooperation is central to the mutually beneficial integration model. Schools and enterprises should establish sustainable cooperation mechanisms, transitioning short-term projects into strategic, long-term collaborations that ensure resource sharing and mutual benefits.

Regular cultural exchanges should be held to foster mutual understanding and reduce conflicts arising from differing goals. Cultural integration enhances trust, promotes innovation, and provides a strong foundation for long-term industry-education integration.

3.3 Final Remarks

The mutually beneficial industry-education integration model, through a well-organized and systematic collaborative mechanism, effectively aligns the resources and needs of the government, enterprises, and universities. This integration plays a crucial role in deepening school-enterprise cooperation and enhancing the accuracy and effectiveness of talent cultivation. By adopting a multi-theoretical framework, supported by cooperative game theory, systems theory, and social exchange theory, the model fosters mutual development across various dimensions, including policy incentives, curriculum development, practical teaching, and resource sharing.

The model encourages a holistic and dynamic approach, ensuring that both industries and educational institutions contribute to and benefit from the process. Through continuous feedback and iterative optimization, the model adapts to changing industry demands and educational needs, leading to a better alignment between the supply of talent and the requirements of the job market. It also plays a pivotal role in supporting local economic and social development by cultivating high-quality talent that meets industry standards. As a result, this integration model not only addresses the immediate needs of both industries and educational institutions but also creates a sustainable, long-term framework that promotes a win-win situation, benefiting all stakeholders involved. Ultimately, the model contributes to the sustained growth of regional economies and the advancement of both the educational sector and industry.

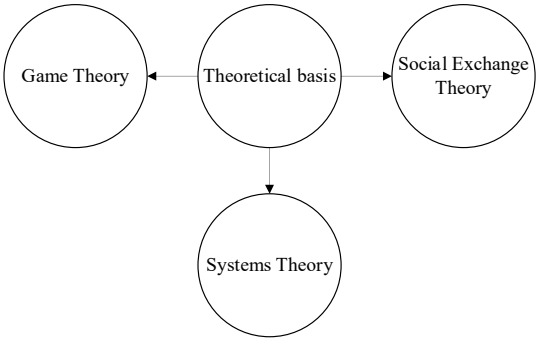

Fig. 2. Theoretical structure diagram

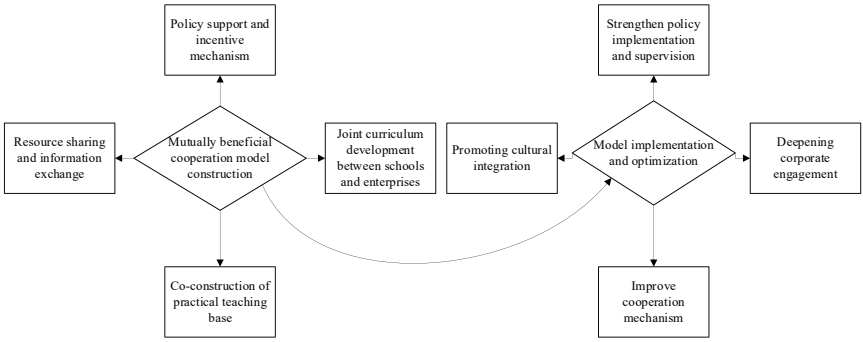

Fig. 3. Structure of Mutually Beneficial Industry-Education Integration

4 Practical Implementation of the Mutually Beneficial Industry-Education Integration Model

Our school has signed strategic cooperation agreements with large energy companies such as Tibet State Grid to further promote talent training and energy development in the field of clean energy. During the cooperation process, enterprises actively participated in the training of talents in the school, provided a practical platform, and participated in the course design and teaching content optimization. For example, the anti-violation competition organized by the enterprise introduced the safety production needs into the campus, enhancing students' safety awareness and operating specifications. This close cooperation model has cultivated high-quality talents that meet the needs of enterprises, promoted the deep integration of schools and enterprises, and achieved the goal of talent co-construction.

In terms of the co-construction of party building between schools and enterprises, our school plays a leading role in party building and closely combines the construction of party organizations with the improvement of professional knowledge. Through joint party classes, special lectures and other forms, the two sides jointly improve the professional quality and theoretical level of party members, enhance the stickiness of

cooperation, and provide a platform for teachers, students and enterprise employees to learn from each other. The party building leadership has mobilized the enthusiasm of both parties, promoted the in-depth development of industry-education integration, and formed a win-win situation of cooperation.

Our school also actively serves the industry and deepens employee training, scientific research and technological development through school-enterprise cooperation. For example, we cooperated with enterprises to develop intelligent grounding wire clamps and "Sunshine Pasture" multifunctional bidirectional inverters. The enterprise mentors directly participated in the training of students, and the students' research results were directly applied to the production of enterprises. Figure 4 and 5 show the works. This not only improved the students' practical ability and scientific research level, but also injected new impetus into the technological innovation of enterprises. The two sides cooperated in the sharing and co-construction of professional equipment, realized the sharing of talents and resources, and promoted the sustainable development of industry-education integration.

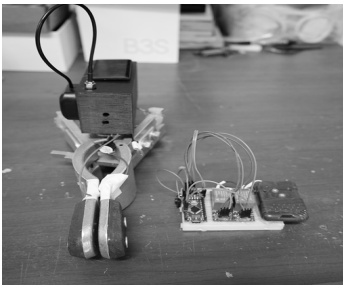

Fig. 4. Physical picture of the intelligent wiring clip

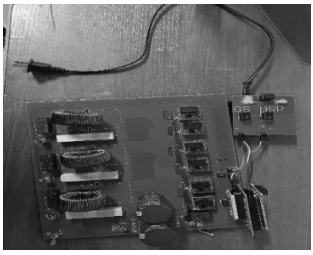

Fig. 5. Physical picture of the intelligent wiring clip

5 Conclusion

This study systematically analyzes the industry-education integration model at Tibet Agriculture and Animal Husbandry College and proposes a mutually beneficial school-enterprise cooperation model to address the challenges faced by Tibetan universities in talent cultivation and technological innovation. The research indicates that industry-education integration is an effective approach to enhancing the quality of talent training

in applied universities, and the mutually beneficial cooperation model provides a feasible path for practical implementation.

Under this model, the government, enterprises, and universities achieve resource integration. The government plays a strategic guiding role through policy support and financial guarantees. Enterprises, as core drivers of technological innovation, participate in curriculum development, co-build practical bases, and engage in teaching activities, thus enhancing the relevance of talent training. Universities optimize curriculum design and strengthen practical teaching to improve students' practical skills and employment competitiveness.

Practical application has demonstrated that the mutually beneficial cooperation model effectively integrates resources from all parties, achieving a win-win situation in terms of both benefits and efficiency, and promoting the sustainable development of industry-education integration. The collaboration between the School of Electrical Engineering and enterprises such as Tibet State Grid has achieved significant results in the clean energy sector, contributing to local economic development. This model provides a feasible reference for applied universities in Tibet and other regions, not only improving talent training quality but also fostering technological progress in industry and economic growth.

This study preliminarily verifies the effectiveness of the mutually beneficial industry-education integration model, demonstrating that with government policy support, deep enterprise involvement, and university reform, industry-education integration can better serve local economic development. Future research will further explore the application and promotion value of this model in characteristic industries such as clean energy, providing more practical and effective guidance for related fields.

Acknowledgments

This article represents a phased research outcome of the general project titled "Research on the School-Enterprise Mutual-Benefit Industry-Education Integration Training Model in Application-Oriented Universities in Tibet" (Project No. XZEDGP240066), under the Higher Education Teaching Reform Research Program of the Tibet Autonomous Region.

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