Exploration of Pathways to Enhance Entrepreneurial Competence in Local Applied Undergraduate Institutions from the Perspective of Industry-Education Integration

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Abstract: Under the deepening advancement of industry-education integration, local applied undergraduate institutions must cultivate entrepreneurial talents with an industry demand-oriented approach. As a representative applied engineering institution in Gansu, Lanzhou Institute of Technology has accumulated practical experience in entrepreneurship education through SYB training. However, issues such as content detachment from industrial needs and insufficient collaboration between schools and enterprises persist. Taking the university as a case study, this paper analyzes the bottlenecks and pathways for enhancing students' entrepreneurial capabilities under industrial-education integration. The research reveals that industrial-education integration can address the shortcomings of SYB training through resource integration, scenario construction, and interest binding, while bottlenecks like inadequate content adaptability and weak faculty strength require overcoming through content optimization and faculty enhancement strategies. The findings provide valuable insights for entrepreneurship education reforms in similar institutions and contribute to the high-quality development of regional economies.

Keywords: Industry-Education Integration; Local Applied Undergraduate Institutions; Entrepreneurial Ability; SYB Training; Path Optimization

1. Introduction

Against the backdrop of deepening the national policy of integrating industry and education, local applied undergraduate colleges, as the core carriers of regional talent cultivation, need to build an entrepreneurial talent training system guided by industrial demand. As a representative of applied engineering colleges in Gansu, Lanzhou Institute of Technology's educational positioning is highly aligned with local pillar industries such as equipment manufacturing and new energy. It has accumulated practical experience in entrepreneurship education through SYB ("Start Your Business") training. However, current training still faces problems such as a disconnect between content and industry demand, insufficient depth of collaboration between schools and enterprises, and limited efficiency in resource integration, which restrict students' entrepreneurial abilities from upgrading to practical and professional levels. This article takes the school as a research sample to systematically analyze the bottlenecks and breakthrough paths in improving students' entrepreneurial abilities from the perspective of industry education integration. The aim is to provide practical solutions for similar universities to learn from and help promote high-quality regional economic development.

2. Integration of Industry and Education and Current Status of Entrepreneurship Education in Local Applied Undergraduate Colleges

2.1 The Connotation and Development Trend of Industry Education Integration

The integration of industry and education is a model based on the goals of "collaborative education, resource sharing, and mechanism co construction", which achieves a deep connection between the education chain, talent chain, and industry chain. From international experience, both Germany's dual system and the United States' school enterprise cooperation in education focus on "practical embedded teaching" as the core, emphasizing the leading

role of industrial demand in talent cultivation [1]; Domestically, driven by policies, it has gradually upgraded from a single form of cooperation such as early "enterprise visits and order cultivation" to "integration of industry, academia, research and application". Through industry feedback to optimize the curriculum system and strengthen practical links, it has become the core path for local applied universities to enhance the targeted talent cultivation [2].

2.2 Analysis of the Current Situation of Entrepreneurship among Students in Local Applied Undergraduate Colleges

The entrepreneurship of students in local applied undergraduate colleges in Gansu is facing dual support of "policy benefits" and "industry opportunities": Gansu's entrepreneurship support policies clearly provide funding subsidies and incubation venue support [3], and the upgrading of equipment manufacturing and new energy industries in Lanzhou has further stimulated a large demand for technology-based entrepreneurship. But the practical challenges are still prominent: firstly, the resources of high-end industries are limited, and student projects are difficult to connect with core technologies and market-oriented funds; Secondly, the cooperation between schools and enterprises is shallow, mostly staying at the level of "visiting and learning", lacking practical opportunities for real industrial projects; The third issue is severe homogenization of projects, with insufficient exploration of characteristic industries such as biomedicine and cultural tourism in Lanzhou, resulting in a low survival rate of entrepreneurial projects and difficulty in adapting to regional industrial development needs[4]. The research by Jun Jiang et al. also confirms that poor resource integration and lack of practical opportunities are common challenges in entrepreneurship education in local colleges and universities [5].

3. Implementation of SYB Training at Lanzhou Institute of Technology

3.1 Introduction to SYB Training

SYB training is developed by the International Labour Organization of the United Nations and promoted in over 100 countries worldwide. It is an internationally recognized mature entrepreneurship education system. Its core covers 8 modules including entrepreneurial ideation, market analysis, financial planning, etc. It features interactive teaching, case simulation, and practical exercises, aiming to help students establish a systematic entrepreneurial thinking, master the core skills required for project implementation, and provide basic support for the cultivation of entrepreneurial talents in universities [6].

3.2 Case Analysis of SYB Training at Lanzhou Institute of Technology

Lanzhou Institute of Technology takes "credit recognition + professional integration" as its core and constructs a SYB training system with engineering characteristics: incorporating training into innovation and entrepreneurship credit management, prioritizing courses for engineering majors such as computer science and mechanical engineering, adopting a "centralized teaching + group practice" model, and training more than 400 people per year. Breaking through the traditional theoretical teaching mode in teaching, the focus is on integrating real cases of Lanzhou equipment manufacturing enterprises, and enhancing practicality through "entrepreneurial sand table simulation" and "project roadshow training" [7].

From the perspective of implementation effectiveness, the participation rate of engineering majors has reached 35%, and 82% of participating students have provided feedback that they are able to systematically master the basic entrepreneurial process; In the past three years, the participating students have led 12 projects that have won provincial-level or above awards, and 3 projects have successfully settled in the school's entrepreneurship incubation base. But the shortcomings are also obvious: technology transformation projects account for only 20%, and most projects are concentrated in the field of light asset services. The adaptability to the engineering advantages of the university and the industrial upgrading needs of Lanzhou still needs to be improved [8].

4. The Mechanism of SYB Training in Enhancing Students' Entrepreneurial Ability from the Perspective of Industry Education Integration

4.1 Deep Integration of Theoretical Knowledge and Practical Skills

The integration of industry and education has built a three-level transformation bridge of "theory simulation practical" for SYB training. In the theoretical teaching stage, Lanzhou Institute of Technology combines the Lanzhou Industrial Demand Restructuring Course: the "Market Analysis" chapter introduces research cases of industrial parks in Lanzhou New Area, and the "Financial Planning" module adds a special topic on engineering project R&D cost accounting to help students master targeted knowledge such as "industrial demand matching" and "technology cost control"; In the simulation practice stage, the "entrepreneurship sandbox simulation + project roadshow training" mode is adopted, where students simulate the establishment of a "small mechanical parts enterprise" in groups, and the entire process is used to deduce practical scenarios such as "risk assessment" and "inventory management"; During the roadshow, local business leaders were invited to serve as judges, forcing students to transform their technology transformation ideas and business operation logic into practical planning solutions, achieving a deep transformation of knowledge into skills [9].

4.2 School Enterprise Cooperation Promotes Efficient Integration of Entrepreneurial Resources

Lanzhou Institute of Technology has established deep cooperation with equipment manufacturing and new energy enterprises in Lanzhou New Area to build a three-dimensional resource integration system of "project funding mentor" [10]

Project Resources: Jointly building an "Industry Demand Project Library" between schools and enterprises, transforming practical technical needs such as optimizing enterprise component testing devices into entrepreneurial topics. Multiple student teams have already carried out practical work based on projects in the library, enabling entrepreneurial directions to accurately connect with industry pain points;

Financial resources: Jointly establish the "Engineering Entrepreneurship Special Fund" (with a 1:1 ratio of school enterprise funds) to provide start-up funds of 5000-20000 yuan for start-up projects. At the same time, assist in connecting with Gansu's "Entrepreneurship Guarantee Loan", and help 23 teams obtain loans exceeding 3 million yuan, alleviating the problem of "difficult start-up" in entrepreneurship;

Mentor resources: Establish a "school enterprise dual mentor team", where enterprise mentors focus on technology implementation and market analysis to provide practical guidance, while on campus mentors focus on theoretical support and polishing of entrepreneurial plans. Over the past two years, more than 120 coaching sessions have been conducted, significantly improving project feasibility.

4.3 Systematic Cultivation of Entrepreneurial Thinking and Innovative Consciousness

SYB training focuses on "problem orientation" and cultivates students' innovative thinking through the integration of industry and education scenarios. In teaching, questions are set around practical issues such as "cost reduction and efficiency improvement in Lanzhou equipment manufacturing enterprises", guiding students to break out of the "single perspective of technology research and development" and establish a complete thinking framework of "opportunity identification resource integration risk prediction" [11]; In the sand table simulation, unexpected scenarios such as "raw material price increases" and "breakthroughs in competitive technology" are set up to force students to innovate their response strategies, such as proposing "school enterprise joint procurement" and "customized technical services"; In addition, through the "Entrepreneurship Pain Point Review Meeting", students combine local industry cases to optimize solutions to problems such as "technology and market disconnect", and transform innovative thinking into practical problem-solving abilities [12].

5. Existing Problems and Challenges

5.1 Insufficient Adaptation of Training Content to local Industry Needs

There is a clear disconnect between the training content of SYB and the industrial demand in Lanzhou: the textbook cases mainly focus on service industries such as catering and

retail, with less than 10% of cases involving pillar industries such as equipment manufacturing and new energy, making it difficult for students to transfer knowledge to local industrial scenarios; The core module of "commercialization of professional technology" is missing, and key guidance such as "technology patent conversion and industrial product market docking" is not provided for engineering students, which directly leads to the proportion of technology conversion projects for participating students being only 20%, which seriously does not meet the needs of Lanzhou's industrial upgrading [11]. Zhang Yanchao's research also found that the disconnect between content and industry is the main weakness of entrepreneurship education in the context of industry education integration [13].

5.2 There are Three Shortcomings in the Construction of the Teaching Staff Team

The SYB training faculty at Lanzhou Institute of Technology is facing the problems of "shortage of quantity, biased structure, and weak experience": firstly, the number is insufficient, with an average annual training requirement of more than 400 people, but only 42 certified trainers, and the teacher-student ratio of 1:50 far exceeds the ideal ratio of 1:30, making it difficult to guarantee interactive teaching; Secondly, there is a structural imbalance, with 60% of the teaching staff being counselors or homeroom teachers who only understand basic theories, lacking a background in engineering majors. Among the 40% of professional teachers or enterprise mentors, most of them are part-time and only teach 3-5 times a year, making it difficult for them to participate in teaching systematically; Thirdly, the practical experience is weak. 85% of the faculty on campus have no entrepreneurial practical experience, making it difficult to answer practical problems such as "commercialization of engineering technology and cost control of industrial projects", and the teaching is disconnected from the actual industry [12].

5.3 Insufficient Student Engagement and Sustainability

Multiple factors constrain students' enthusiasm for participation: firstly, time conflicts. Training is concentrated in the middle and later stages of the semester, overlapping with engineering courses such as experiments and course design. 83% of participating students reported "difficulty balancing time", and about 15% were absent midway; Secondly, the incentive is single and only linked to one innovation and entrepreneurship credit, without any association with core benefits such as scholarships or enterprise internship recommendations, making it less attractive than subject competitions; Thirdly, there is a lack of experience, with some courses still mainly focused on theoretical lectures (interactive practical training accounts for less than 40%), and the correlation between case studies and engineering is low. About 20% of students who complete the training do not participate in subsequent entrepreneurial practices, forming a "training practice" broken chain [13].

6. Improvement Path and Strategy Suggestions

6.1 Optimize Training Content and Accurately Connect with Local Industry Needs

Refactoring the SYB training system around the three pillar industries of equipment manufacturing, new energy, and biomedicine in Lanzhou: firstly, adding characteristic modules such as "commercialization of engineering technology" and "Lanzhou industry demand analysis" to transform real needs such as enterprise component improvement and industrial software adaptation into teaching cases; The second is to invite technical backbone of enterprises to participate in course design, ensuring that the content covers key knowledge of engineering entrepreneurship such as "technology patent conversion process", "industrial product cost accounting", "industrial policy docking", etc; The third is to establish a "dynamic update mechanism for course content", adjust the case library annually according to the direction of Lanzhou's industrial upgrading, and ensure that training content resonates with industry demand on the same frequency.

6.2 Strengthen the Construction of Teaching Staff and Build a "Dual Teacher and Dual Ability" Team

Adopting a dual track model of "on campus

cultivation + off campus introduction" to address the shortcomings of teaching staff: firstly, on campus cultivation, organizing teachers to participate in practical training for key enterprises in Lanzhou (such as equipment manufacturing enterprise technology research and development, new energy enterprise market operation), and only those who pass the assessment can undertake SYB teaching tasks; Secondly, we plan to introduce 10-15 enterprise technical directors and entrepreneurs as full-time off campus mentors, responsible for practical training and project guidance; The third is to establish a "dual dimensional evaluation mechanism" that includes student project conversion rate and enterprise satisfaction in teacher assessment, forcing teachers to enhance their "theoretical + practical" dual abilities.

6.3 Improve Incentive Mechanisms to Stimulate Students' Enthusiasm for Participation

Build a full chain incentive system from three aspects: "credits, rewards, and incubation": firstly, upgrade credit exchange, link training with two innovation and entrepreneurship credits, and participants who win project awards can additionally exchange professional elective course credits; The second is to establish special rewards and launch the "Engineering Entrepreneurship Special Scholarship", giving outstanding students a reward of 5000-10000 yuan, and giving priority to recommending them for internships in cooperative enterprises; The third is to open up incubation channels and establish a "training incubation" linkage mechanism. High quality projects can directly settle in the school's entrepreneurship incubation base, enjoy free venues and financial support, and lower the threshold for starting a business.

6.4 Deepen School Enterprise Cooperation and Build a Long-Term Collaborative Mechanism

With the core of "benefit sharing and clear rights and responsibilities", we will strengthen the deep cooperation between schools and enterprises. Firstly, we will jointly build a "Industry Education Integration Entrepreneurship Practice Base", where enterprises provide technical equipment and real project resources, and schools are responsible for teaching management and student organization, achieving the integration of "teaching practice"; The second is to carry out "school enterprise joint entrepreneurship projects", in which enterprises propose technical needs, student teams form project teams to tackle problems, enterprises provide technical guidance and market resources, and schools provide theoretical support, forming a "demand research and development landing" closed loop; Thirdly, a long-term cooperation agreement should be signed to clarify the rights, responsibilities, and benefits distribution between schools and enterprises in teacher sharing, project development, and achievement transformation (such as providing proportional technology dividends to enterprises after student projects are implemented), ensuring the stability and sustainability of cooperation.

7. Conclusion and Prospect

7.1 Research Conclusion

This study takes Lanzhou Institute of Technology as a sample and draws the following core conclusions: firstly, SYB training is an effective carrier for local applied undergraduate colleges to enhance students' entrepreneurial abilities, but it needs to rely on the integration of industry and education to achieve maximum value; Secondly, the integration of industry and education can be achieved through three major paths: resource integration (projects, funds, mentors), scenario construction (real industry problems, practical simulations), and interest binding (school enterprise collaboration, student incentives), to fill the gap between theory and practice and the lack of resources in SYB training, and to help students build a three in one entrepreneurial ability system of "theoretical knowledge practical skills innovative thinking"; Thirdly, the current local applied colleges' SYB training still faces bottlenecks such as insufficient content adaptation, weak faculty capacity, and insufficient school enterprise collaboration. It is necessary to break through "content optimization, faculty strengthening, and mechanism improvement" in order to cultivate entrepreneurial talents that are suitable for regional industrial development. Overall, the integration of industry and education is the core link to activate the effectiveness of SYB training and enhance students' entrepreneurial

abilities.

7.2 Future Outlook

Future research can be deepened in three aspects: firstly, expanding the research scope to include other applied universities in Lanzhou, and extracting universal improvement paths through multiple case comparisons; The second is to refine the research dimensions, focusing on micro issues such as "SYB training differentiation design (engineering vs humanities)", "optimization of school enterprise benefit distribution mechanism", and "dynamic evaluation of entrepreneurial ability", to enhance research depth; The third is to introduce long-term tracking and evaluation, establish a complete evaluation system of "short-term participation - mid-term project survival rate - long-term regional economic contribution", quantify the long-term impact of SYB training and industry education integration on regional economy, and provide more accurate support for policy optimization.

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