

Exploration on the Construction of Innovation and Entrepreneurship Education Ecosystem in Local Normal Universities: Guided by Serving Basic Education

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Abstract: This study is based on the theoretical framework of "three chain collaboration" and combines the "education research service" trinity model to propose the construction of an innovation and entrepreneurship education ecosystem guided by service-oriented basic education. The system aims to cultivate "entrepreneurial teachers" through the reconstruction of the education chain, activate the innovation chain to achieve the transformation of educational achievements, empower the industry chain to build a "U-G-I-S" collaborative network, and ultimately achieve a paradigm shift from "knowledge imparting" to "innovation empowerment", providing ideas for the basic education of school uniforms in local normal universities.

Keywords: innovation and entrepreneurship education, industry empowerment, basic education

1. Introduction

In the context of the strategy of building a strong education country in the new era, the digital transformation of basic education and the upgrading of teacher capabilities have become the core propositions for promoting high-quality development of education. With the deepening implementation of the "double reduction" policy and the comprehensive implementation of the new curriculum standards, the demand for innovative teaching resources, smart educational tools, and composite teachers with both teaching ability and innovative literacy in primary and secondary schools is becoming increasingly urgent. However, the traditional teacher education model still focuses on "knowledge imparting+skill training" as the core, and the curriculum system lags behind the practice of basic education reform. The trained teacher students are difficult to adapt to the new abilities of interdisciplinary teaching, project-based learning, and educational technology application in primary and secondary schools. At the same time, local normal universities face three major structural contradictions in serving basic education: firstly, the disconnect between the training objectives of normal students and the innovative needs of basic education. Innovation and entrepreneurship courses are mostly elective courses in general education, with insufficient integration with professional education and ideological and political education, resulting in weak innovative thinking and entrepreneurial abilities among teacher trainees, making it difficult to meet the needs of primary and secondary schools for "entrepreneurial teachers" (who can design innovative courses, develop teaching tools, and carry out educational technology applications) [1]. Secondly, there is obstruction in the transformation of scientific research achievements. Local normal universities excel in humanities and social sciences, and their educational research achievements, such as psychological health intervention programs, local cultural curriculum programs, and innovative teaching methods, are mostly "soft sciences" that are difficult to directly apply like patented technologies in science and engineering. These circumstances have led to a disconnect between research outcomes and the needs of primary and secondary schools, creating an awkward situation where "university research remains unadopted by schools" [2]. Thirdly, shallow cooperation between schools and enterprises. Although some universities and educational technology enterprises jointly establish internship bases, the cooperation mostly stays at the level of "student internships" and "enterprise lectures", and has not formed a closed-loop ecology of "university research and development enterprise incubation primary and secondary school applications". The disciplinary structure mainly focused on literature, history, and philosophy has a low degree of integration with mainstream industries in the region, which further restricts the depth of industry education integration. Faced with this dilemma, innovation and

entrepreneurship education is seen as a key path to resolving contradictions. The core concept is to cultivate innovative thinking and entrepreneurial practice training, stimulate the endogenous motivation of teacher trainees, promote their transformation from "knowledge receivers" to "innovative practitioners", and thus serve the digital transformation of basic education.

2. Core logic: Empowerment and service mechanism under the "three chain collaboration" framework

The "three chain collaboration" is the core driving force of the innovation and entrepreneurship education ecosystem in local normal universities. Through the reconstruction of the education chain, activation of the innovation chain, and empowerment of the industry chain, a closed loop is formed to drive normal universities to transform from "knowledge exporters" to "basic education innovation service providers".

2.1 Education chain restructuring: Reforming the education system to cultivate "entrepreneurial teachers"

The reconstruction of the education chain aims to cultivate "entrepreneurial teachers" who possess both teaching ability and innovative literacy, embedding innovative thinking and entrepreneurial ability into the entire process of teacher training. Traditional teacher education focuses on skills training such as "three words and one sentence", while innovation and entrepreneurship education requires teacher students to master the ability to design smart classroom tools, develop school-based courses, and carry out project-based teaching. Therefore, local normal universities can complete the full process practice from demand research to product prototype through the implementation of specialized and innovative integrated courses. It not only exercises students' innovative practical ability, but also solves the practical problems existing in rural schools.

2.2 Activation of innovation chain: The "generalized transformation" mechanism of educational and scientific research achievements

Innovation chain activation breaks through the traditional model of scientific research achievement transformation and establishes a "generalized transformation" mechanism guided by "serving basic education". By connecting with primary and secondary schools through university technology transfer centers, research results can be transformed into practical teaching resources or teacher training projects. For example, the "Sunshine Psychology" border assistance action developed by Yunnan Normal University and the "Soul Dream Journey" psychological group assistance program for migrant children have been piloted and promoted by the Education Bureau, covering primary and secondary schools in the region. These programs not only improve students' mental health levels, but also accumulate practical data for universities. At the same time, we have reformed the teacher evaluation mechanism to include social service contributions such as horizontal projects, achievement transformation, and entrepreneurial guidance in the professional title evaluation indicators, stimulating the enthusiasm of teachers to participate in transformation.

2.3 Empowering the industrial chain: Building a collaborative network for deep industry participation

Empowering the industrial chain will concretize the "industrial chain" into a "basic education ecosystem" and build a collaborative network of "university government industry primary and secondary schools". Local normal universities, in collaboration with education bureaus and technology enterprises, jointly establish educational innovation laboratories, using primary and secondary schools as "experimental fields" for educational technology products. For example, universities can collaborate with technology companies to develop AI assisted teaching tools, pilot their application in regional primary and secondary schools, optimize algorithms based on teacher feedback, and ultimately form scalable products. Through collaborative networks, universities can accurately obtain the needs of primary and secondary schools, enterprises provide technical support, and education bureaus coordinate policy support, forming a virtuous cycle of "demand feedback product iteration service upgrade".

The "three chain collaboration" cultivates innovative talents through the reconstruction of the education chain, activates and transforms scientific research achievements through the innovation chain, and empowers the industrial chain to meet the needs of basic education, forming a closed loop of "talent achievement service", and promoting the transformation of local normal universities from "teacher

suppliers" to "basic education innovation engines".

3. Introverted refactoring: Constructing a service oriented "four in one" system

Local normal universities need to generate endogenous driving force for serving basic education through internal system reform, and build a four in one supporting framework of "education system practice system service system guarantee system". This system is oriented towards serving the needs of basic education, and through curriculum restructuring, platform upgrading, resource integration, and institutional innovation, it achieves a systematic transformation of the teacher training model.

3.1 Education system: Promote the course module of "general education foundation+professional integration+practice deepening"

The reconstruction of the education system focuses on breaking down the disciplinary barriers of traditional teacher education and integrating the cultivation of innovation and entrepreneurship abilities into professional courses. For example, in response to the shortage of experimental equipment in rural schools, the primary education major at Hebei Normal University for Nationalities has added a course on "Maker Education Design and Implementation", requiring normal students to develop low-cost scientific teaching aids based on the needs of rural schools. Using waste materials to design a "simple optical experimental box" not only solves teaching difficulties, but also cultivates students' innovative practical abilities. At the same time, the integration concept of "specialization and creativity" will be integrated into curriculum design, and innovative thinking training modules will be embedded in courses such as "Introduction to Education", enabling teacher trainees to master the ability to design smart classroom tools, develop school-based courses, and directly serve the teaching innovation needs of primary and secondary schools.

3.2 Practice system: Building a three-level carrier of "Collaborative Innovation Platform+Open Training Platform+Incubation Platform"

The practical system provides a multi-level practical platform for teacher trainees to transform from theory to practice. The collaborative innovation platform focuses on the research and development of educational technology products, and normal students can participate in the development of projects such as the "AI essay grading system"; The open training platform (virtual simulation training room) provides immersive teaching scenarios, and the normal province can simulate primary and secondary school classrooms for teaching design and reflection; The incubation platform (seed fund) supports the implementation of public welfare entrepreneurship projects, such as designing online psychological counseling tools for left behind children, directly serving weak links in basic education. The projects incubated by the innovation and entrepreneurship practice system of normal university students can be directly applied to regional primary and secondary schools, enhancing students' practical application abilities and the social service capabilities of local normal universities.

3.3 Service system: Establish a "dual teacher" mentor team and demand docking mechanism

The core of the service system is to build a "dual teacher" mentor team, integrating university teachers, backbone teachers in primary and secondary schools, and enterprise technical experts to provide full process guidance for normal students from teaching design to product implementation. For example, Hebei Normal University for Nationalities hires renowned teachers from primary and secondary schools as "entrepreneurial mentors" to guide students in designing teaching plans that meet the requirements of the new curriculum standards; Simultaneously establish a "demand list supply list" database to accurately match the needs of primary and secondary schools with university resources. Through the database, we have customized a "Local Culture Curriculum Collection" for rural schools, which not only meets the needs of primary and secondary schools for characteristic courses, but also accumulates practical cases for universities.

3.4 Guarantee system: Reform evaluation mechanism and flexible educational system design

The guarantee system stimulates the enthusiasm of teachers and students to participate in serving basic education through institutional innovation. We have reformed the teacher evaluation mechanism to include the achievements of serving basic education, such as curriculum development and teacher

training frequency, in the professional title evaluation indicators. For example, many local universities stipulate that teachers guiding normal students to carry out innovation and entrepreneurship projects can be converted into teaching workload; Establish flexible educational systems, encourage and support teacher trainees to participate in innovative projects in basic education, and conduct educational practices in rural schools. After returning to school, the practical results can be equivalent to a graduation thesis. In addition, measures such as special funding support and campus culture creation will be taken to build an ecosystem that encourages innovation and tolerates failure, providing sustained momentum for the operation of the system.

The "four in one" system cultivates innovative talents through the reconstruction of the education chain, provides transformation carriers for the upgrading of the practice chain, optimizes the service chain to achieve precise docking, improves the guarantee chain to stimulate endogenous power, and promotes the transformation of local normal universities from "knowledge exporters" to "basic education innovation service providers", providing systematic support for the high-quality development of education.

4. Outward coupling: a deep integration path between ecosystems and basic education sites

Local normal universities need to transform the innovative potential of the ecosystem into basic education service capabilities through external collaboration, and build a three-dimensional path of "collaborative education community service capability transformation channel two-way empowerment new paradigm" to achieve deep interaction and value co creation between universities and basic education sites [3].

4.1 Collaborative education community: Building the "U-G-S" collaborative network

Universities establish a "Basic Education Innovation Alliance" with local governments, primary and secondary schools, and enterprises to form a collaborative education mechanism of "University Government Primary and Secondary Schools" (U-G-S). Universities can organize normal students and primary and secondary school teachers to jointly develop after-school service course packages under the background of "double reduction", and promote them to regional schools through alliance platforms. For example, since 2019, Hebei Normal University for Nationalities has jointly established a teacher education collaborative development pilot zone with the Education Bureau of Chengde City, the Education Bureaus of various counties and districts, and primary and secondary schools. Using the experimental zone as a platform, teacher trainees and primary and secondary school teachers jointly design a "Local Culture Study Course", covering modules such as intangible cultural heritage skills experience and red culture study. This not only enriches the content of after-school services, but also cultivates the curriculum development ability of teacher trainees. At the same time, the alliance regularly holds "Basic Education Innovation Workshops", inviting primary and secondary school teachers to identify teaching pain points, and university teams to provide solutions, forming a closed loop of "demand research application".

4.2 Service capability conversion channel: Connecting the "last mile" of achievement conversion

Universities implement a pairing mechanism of "universities+experimental zones", achieve the transformation of achievements into practical applications, select potential projects in universities for cultivation and practical training, and ultimately serve frontline primary and secondary schools. For example, in the practice of teacher development pilot zone, the Teacher Education College of Hebei Minzu Normal University has empowered the application of teaching tools developed by normal students to primary and secondary schools in the base through technologies such as "AI essay correction system". The system automatically generates personalized comments based on students' essays, reducing teachers' workload and improving writing teaching efficiency. At the same time, combining the education internship of teacher trainees with public welfare entrepreneurship requires them to carry out innovative teaching practices in the internship school and submit improvement reports. During their internship, the teacher trainees at the school developed the "Rural Children's Reading Promotion Plan" and provided reading guidance for left behind children through an online platform. The project results were incorporated into the school curriculum. The above projects have all won awards in innovation and entrepreneurship competitions such as the "New Humanities" Practice Innovation Competition in Hebei Province and the China International College Student Innovation Competition, achieving the transformation from practice to application.

4.3 Dual empowerment new paradigm: promoting collaborative innovation between basic education and universities

Universities promote basic education reform in reverse by exporting innovative faculty and resources. For example, Minnan Normal University, through resource allocation and collaborative education, has organized expert teams to enter primary and secondary schools to provide teaching guidance, promote high-quality development of education, and create quality improvement projects such as "efficient classrooms" and "teacher workshops". It has also built an expert think tank platform and established a prestigious school alliance to assist teacher development and smart campus construction, and improve the quality of basic education in Zhangzhou. In addition, universities can provide continuous technical support and resource supply to primary and secondary schools by exporting "dual qualified" teachers and jointly building educational innovation laboratories, promoting the transformation of basic education from "passive acceptance" to "active innovation".

Through the collaborative education community, resource sharing, service capability transformation, and application channels are established, and a new paradigm of two-way empowerment is promoted to promote value co creation. Local normal universities and basic education sites have formed a deeply integrated ecological network. This path not only enhances the ability of universities to serve basic education, but also promotes the paradigm shift of basic education from "knowledge imparting" to "innovation empowerment", providing a systematic solution for the high-quality development of education [4].

5. Conclusion

Local normal universities need to adhere to the characteristic path of "teacher education background+cross-border collaboration" in building an innovation and entrepreneurship education ecosystem guided by serving basic education. The main challenges currently faced include: low recognition of entrepreneurship education among teacher trainees and parents, inadequate integration of industry and education due to the mismatch between subject structure and traditional industries, and a lack of evaluation criteria for "non-technical knowledge services". Future research can focus on three directions: first, combining artificial intelligence technology to explore new service forms such as the "education metaverse"; Secondly, establish a dynamic evaluation system to quantify the contribution of the ecosystem to the improvement of the quality of basic education; The third is to strengthen cross regional case comparison and extract replicable models. Through systematic restructuring, local normal universities are expected to transform from "teacher suppliers" to "innovation engines for basic education", providing sustained impetus for the high-quality development of education.

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