HiLL PUBLISHING

Scientific Access, 2025, 1(1), 15-21
https://www.hillpublisher.com/journals/sa/
ISSN Online: 3068-7500

A Study on EPUI Platform-based Teaching Mode for Comprehensive and Innovative Talents from the Perspective of Educational Ecology Theory[1]

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How to cite this paper: Yunfei Shao, Xiangrong Zhou. (2025) A Study on EPUI Platform-based Teaching Mode for Comprehensive and Innovative Talents from the Perspective of Educational Ecology Theory. *Scientific Access*, 1(1), 15-21.
DOI: 10.26855/sa.2025.06.003

Received: April 28, 2025
Accepted: May 29, 2025
Published: June 27, 2025

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Abstract

In order to solve the problem of breaking through the "stuck neck" and seize the commanding heights of innovation, it is the main task of colleges to train comprehensive & innovative talents. Based on the educational ecology theory, this paper proposes an EPUI platform-based teaching model for cultivating comprehensive & innovative talents to optimize the Chinese higher education ecosystem. By creating an educational model with "student-centered", "theoretical teaching & practical teaching" and "inter-school alliance & school-enterprise cooperation" as the core, it is expected to promote the ecological and platform-based development in Chinese higher education. Provide reference and research for and carry out educational reforms for the reform in education.

Keywords

Educational Ecology Theory; EPUI Platform-based Teaching Model; Comprehensive & Innovative Talents; Talent Training

1. Introduction

Innovation-driven is essentially talent-driven. General Secretary Xi has repeatedly pointed out that "we should focus on cultivating innovative and compound talents." The development of compound innovative talent education is aimed at scientific and technological reform and industrial revolution, and is to deal with complex problems that cannot be solved by a single discipline, so as to continuously improve students' innovative thinking and innovation ability. Under the dual drive of current national policy guidance and market demand, the desire for compound innovative talents is more urgent and important than ever before.

The key to cultivating and exporting compound innovative talents is to reform and innovate the higher education model. Compound innovative talents are an extension and progress based on compound talents. They are not simply the sum of compound talents and innovative talents, but have theoretical knowledge and skills reserves in interdisciplinary disciplines, and have innovative thinking and innovation capabilities to cope with scientific research and practical applications, so as to adapt to the diversified needs of economic and social development [1]. However, most of the existing teaching models are loose, lacking a theoretical model for the training of compound innovative talents, and more theoretical research than teaching practice exploration, resulting in serious homogeneity of training models adopted by various universities and disciplines, and an insufficient supply of compound innovative talents. The

[1] The Chinese version of this paper has been published in the *International Journal of Education*, , and this is an authorized translation of it.

cultivation of compound innovative talents requires the support of an integrated teaching model to help students understand the connection between different disciplines from different perspectives and cultivate their ability to apply interdisciplinary knowledge and skills.

Based on the existing research and practice, this paper designs and proposes an EPUI platform-based compound innovative talent cultivation model based on the theory of educational ecology, which consists of theoretical education and practical education as teaching content, a platform as teaching means, and a teaching team that combines universities and enterprises. It also explores the construction of a flexible, open, and sustainable educational platform ecosystem by optimizing the discipline and professional structure, improving the educational resource system, and designing teaching means, in order to provide certain theoretical guidance for the reform of the educational model for compound innovative talents in Chinese universities.

2. Talent Cultivation from the Perspective of Educational Ecology

2.1 Educational ecology theory of higher education

Educational ecology is the result of the intersection of sociology, education, and ecology. It analyzes and solves educational problems from the perspective of the mutual influence and constraints of the educational ecological environment, individual education ecology, group education ecology, and ecological system, and emphasizes exploring the connection and exchange between many internal and external elements of the educational system from macro and micro perspectives. The study of educational ecology originated in Western countries. Researchers represented by W. Waller and E. Ashby integrated educational theory with ecological theory. Later, L. A. Cremin formally proposed the concept of "educational ecology" in his book *Public Education*. J. Eggleston is also an important researcher in educational ecology. In his book *School Ecology*, he studied the distribution dimension of educational resources, enriched the old exploration of educational ecological problems from the perspective of the connection between education and environment, and marked the systematic formation of educational ecological theory [2, 3].

It has only been more than 30 years since the introduction of educational ecology research in our country. It has experienced a development of research and discussion from macro to micro, from theory to practice. In recent years, educational ecology research in the field of higher education has gradually flourished [4]. Based on the perspective of educational ecology, higher education emphasizes the analysis of the relationship between educational subjects (university subjects, university communities, teachers, students, etc.) from the perspective of system theory, as well as the exchange relationship between the internal and external educational environment of the system (internal environment: student groups or academic communities within universities; external environment: social, economic, cultural, political, etc.). The entire higher education ecosystem continuously improves itself and adapts to each other through the input, output, and transformation of educational subjects and educational environment, which promotes the development of the higher education system from simple to complex. At present, our country's educational subjects and educational environment are committed to promoting the development of higher education. The exchange and cooperation of academic communities are growing, the growth of education funds has helped the construction of higher education infrastructure, and higher education policies have correctly guided the development of higher education. Colleges and universities should also seize the opportunity to deepen the reform of the teaching system and improve the educational ecological environment to export more higher education talents to the country.

2.2 Educational ecosystem promotes platform-based teaching

The cultivation of talents through education requires the educational ecosystem to play its overall role and continuously integrate the various elements of the ecosystem to achieve the optimal state. Therefore, colleges and universities have gradually realized the advantages of using systems theory and holism to guide teaching, as well as the mutual benefit, symbiosis, and co-evolution brought by the educational ecosystem [5].

The educational platform established by colleges and universities and entities within the educational ecosystem is not only a small ecosystem, but also has the typical network effect characteristics of the platform model. It can be called a platform educational ecosystem. At present, colleges and universities are committed to building an educational ecosystem with other colleges and universities, governments, enterprises, scientific research institutes, etc., and jointly developing collaborative and open communication platforms. A good teaching platform not only provides a way for educational entities to quickly establish communication and contact, but also reduces the transaction costs

and coordination costs of educational entities. In more cases, it helps educational entities to achieve intercommunication with the educational environment [6]. Therefore, this teaching platform can be regarded as a virtual organizational form or a network platform built on computers and the Internet. Existing online platform teaching models can be divided into three categories: software-based teaching platforms represented by DingTalk and Feishu; public open platforms represented by Tencent Classroom, NetEase Cloud Classroom, and China University MOOC; and private online teaching platforms built by educational institutions using online school systems [7]. Under the trend of education networking and platformization, teaching resources and learners interact through the intermediary of "platform providers". Rich online education platforms are favored by more and more educational groups due to their advantages, such as multimedia resources, convenient collaborative communication, and friendly interactive interfaces. Whether it is a physical online education platform or a virtual organizational form, it attracts various entities to share high-quality teaching resources, improves the teaching quality and overall level of colleges and universities, and students can also obtain more teaching guidance and practical experience, thus forming a virtuous circle within the platform education ecosystem. It is precisely because of the network effect of platform-based teaching that it can attract more learners and educators of teaching resource information, making the teaching resources within the platform more abundant and the value of platform-based education greater.

2.3 The applicability of the educational ecosystem to the cultivation of compound innovative talents

Encouraging and attracting social forces to participate in the construction of various high-quality course resources is the basic way to enrich the teaching resources of compound innovative talents. Adhering to cooperation, openness, and sharing is the basic principle of reforming the education system for compound innovative talents. The theory of educational ecology is the driving force for calling on all social entities to participate in talent training, and the platform is a channel for providing teaching activities. The construction of a teaching model for compound innovative talents guided by the theory of educational ecosystem is highly appropriate and necessary. On the one hand, the innovative education of talents in colleges and universities is highly complex and systematic. If the goals of talent education are not integrated with the scenario of the social ecosystem, teaching will be out of touch with reality. The thinking method of educational ecology theory emphasizes starting from the whole, especially paying attention to the balance and linkage of the system. Schools, governments, enterprises, and other educational entities cannot be independent of the social ecosystem, and compound innovative talents also need to rely on the whole society. On the other hand, there are still many misconceptions and stubborn diseases in the education of compound innovative talents in our country at this stage, and there is a lack of effective methodological guidance. The theory of educational ecology can formulate targeted teaching models for compound innovative talents and provide new thinking concepts and methods for teaching.

From the perspective of educational ecology theory, the EPUI platform teaching model is the concrete application of educational ecological thinking and ecological methodology in the education of innovative talents. It breaks the fixed thinking of theoretical teaching and innovates a diversified cross-training model. The EPUI platform teaching model needs to optimize the overall educational ecosystem based on the advantages and characteristics of the school and social resources. It is the theoretical basis and practical attempt to comprehensively promote the transformation and upgrading of compound innovative talent education. The EPUI platform teaching model adheres to the educational ecology theory thinking and platform model thinking, actively explores new ways of "Internet + education", focuses on building theoretical teaching models and practical teaching methods based on interdisciplinary disciplines, and vigorously promotes the balanced and quality sustainable development of higher education.

3. Exploration of EPUI Platform-based Teaching Model

Promoting compound innovative graduate education requires the consensus of multiple educational subjects, such as the government, schools, enterprises, industries, teachers, and students. It is necessary to consider both student-centeredness and the ecological balance of the overall relationship. However, at this stage, our country's compound innovative talent training model is still in the exploratory stage. There is no mature reference model and standardized teaching path, which leads to universities blindly following the trend and being out of touch with reality when promoting compound innovative talent education. Therefore, it is particularly necessary and urgent to reform the compound innovative talent education system, optimize the educational ecosystem, clarify the relationship between the

various elements, and guide and standardize the implementation of the education model. Guided by the theory of educational ecology, all educational subjects, teaching environment, and other elements in the EPUI platform education model can be closely linked.

3.1 EPUI platform teaching model architecture

The EPUI platform teaching model is a training model and organizational method for compound innovative talents created under the guidance of educational ecology theory. With students, enterprises, and schools as the main subjects of educational ecology, the ecosystem environment is composed of the internal ecological environment - student teams, academic groups, and the external ecological environment - society, economy, culture, politics, etc. The EPUI platform teaching model changes the old concept of focusing on knowledge indoctrination and neglecting ability training, and focusing on examinations and neglecting quality, and constructs an educational platform ecosystem that integrates "student-centered", "theoretical training + practical training", and "inter-school alliance + school-enterprise cooperation".

Under the EPUI platform teaching model, students are both the learners and the center of the platform. Schools and enterprises, as the main teaching subjects, should serve education around students and take the cultivation of students' ability development as an important mission, that is, to cultivate compound innovative talents. Theoretical teaching is the foundation of traditional education, and practical teaching has become the norm of innovative education. The EPUI platform teaching model accommodates both, using the platform to integrate interdisciplinary teaching resources and enrich theoretical teaching, and using the platform to connect practical resources and connect practical teaching links. The above platform teaching model is not just a single expansion of its own teaching content, but an expansion from the past single and single major to diversified teaching content. Higher education has evolved from being able to provide only teaching services for its own students to developing into an educational ecosystem, which requires cooperation and alliance with external forces to achieve rapid expansion and growth needs [8]. Therefore, relying on the teaching platform to form "inter-school alliances" and "school-enterprise cooperation" can provide all students with two interactive, open learning populations that are not restricted by time and space.

Inter-school alliances are a common model for cooperation between universities in Europe and the United States, such as the "Ivy League" of eight top schools in the northeastern United States and the "Claremont Five" composed of top liberal arts colleges in the west. In the alliance system, each school is independent of each other but closely connected, and a sharing mechanism for academic resources such as teachers, courses, equipment, and instruments is achieved through cross-school coordination agencies. Since the 1990s, our country has also gradually tried the joint training model of domestic and foreign universities. For example, Southwestern University of Finance and Economics and the University of Electronic Science and Technology of China jointly opened a joint bachelor's degree program in finance and computer science and technology, adopting the "new business + new engineering" training model, aiming to cultivate compound financial elites with cross-border innovation capabilities. 14 universities and educational institutions in China and Thailand have formed the "China-Thailand Higher Education Cooperation Alliance", which is committed to deepening higher education exchanges, promoting the "Belt and Road" education action, and conducting cross-border academic research and talent training. Universities can give full play to the advantages of each university by exchanging advantageous disciplines or teaching resources with other universities, and concentrate on cultivating compound innovative talents.

The formation of school-enterprise cooperation is a strong combination of the needs of social and economic development and the discipline advantages of universities. It is an effective way to solve the problem of talent education adapting to social needs [9]. A series of emerging high-tech companies were born in the Silicon Valley of the United States, which is a typical example of the combination of school-enterprise cooperation. The Zhongguancun Innovation and Entrepreneurship Community, established in Beijing, is a school-enterprise-government cooperation between Tsinghua University and Peking University. The School of Energy of Huazhong University of Science and Technology has built a multi-level high-quality practical teaching platform for energy and power majors, realized the diversification of educational resources, and strengthened the cultivation of students' innovative ability [10]. The Central University of Finance and Economics and 21Vianet jointly established our country's first blockchain-based school-enterprise cooperation laboratory. School-enterprise cooperation realizes the sharing of school-enterprise resources and complementary advantages, promotes the coordinated docking of scientific research and practice platforms, helps universities grow together with enterprises, and cultivates high-level compound innovative talents with both moral integrity and technical skills for society.

3.2 Connotation of EPUI platform teaching model

At present, our country is vigorously promoting the cultivation of compound innovative talents, and an educational model combining theoretical teaching and platform teaching has begun to emerge. The EPUI platform teaching model is in line with the concept of innovative higher education. Its open school-running philosophy, as well as the concept of building a diversified campus culture, promoting exchanges, cooperation, and common progress among schools, enterprises, and students, is becoming an important innovative model for the reform of the higher education system.

3.2.1 Training objectives: compound innovative talents

In the new era, universities should take interdisciplinary knowledge literacy and innovative practical ability as talent training goals to enhance the competitiveness and influence of our country's higher education talents in the international community. As an independent type of talent, compound innovative talents must not only have professional knowledge of their own disciplines, but also have systematic learning of other disciplines and master the background of interdisciplinary knowledge; they can not only become the main force in the research field of their main profession, but also become the reserve talents of social practice, and contribute to the achievement of excellent scientific research results and the transformation of results.

3.2.2 Teaching content: theory + practice

The integration of theory and practice is to cultivate the academic ability and innovative practical ability of higher education talents under the dual guidance of academic requirements and market demand. First, if there is only theoretical literacy but no practical experience, the theory is just an empty dogma and cannot adapt to the real social environment. Students should look up to the stars in the academic field and write papers on the land of the motherland. Second, if there is only practical experience but no theoretical accumulation, it is impossible to "internalize in the heart and externalize in action". Practical teaching is not an after-school extension of theoretical teaching, but is equally important in the higher education system [11]. Third, theoretical education and practical education are not simply emphasized, but different weights should be given to theoretical and practical teaching content based on the characteristics of the educational subject and the current educational environment. When students first enter school, the focus should be on laying a solid theoretical foundation. In the middle of the teaching period, practical teaching should be the main method of interspersed teaching with theoretical teaching. In the graduation semester, students can be arranged to carry out an off-campus internship and practical activities. The teaching content not only emphasizes the professional imprint and allows the ideological and political education of the course to improve students' ideological literacy, but also cultivates students' patriotic awareness and social responsibility.

3.2.3 Faculty team: inter-school and school-enterprise joint training

Our country has built the world's largest higher education system. However, facing the pressure of a large number of students entering the school, the problem of mismatch between the teaching staff and the requirements of high-quality teaching has been exposed. Therefore, colleges and universities should not only build a team of high-level backbone teachers, but also a group of academic leaders with practical innovation ability, international vision, and both moral integrity and ability, so as to nurture a group of compound innovative students with a team of compound innovative teachers.

First, local governments and universities innovate policies for introducing teachers, inject fresh blood into the academic field for the faculty of universities; strengthen teachers' job awareness, implement competitive employment, and dynamic management of teacher assessment mechanisms. Building a faculty team with "solid professionalism, strong scientific research, superb practice, and noble teacher ethics" is a precise starting point for helping colleges and universities to cultivate talents. Secondly, encourage high-level talents leading the industry to join the talent cultivation community of universities, explore the "school teacher + industry teacher" dual teacher system, establish a cross-disciplinary and strong practice mentor team, and promote the development of talents in universities and the development of the industry in the same direction. As builders and actors of the EPUI teaching model, enterprises, with their cultural background and value orientation that are different from those of schools, have formed a unique cultural environment, technical environment, and practical environment for the new teaching model, laying a good foundation for the development of the EPUI teaching model. Thirdly, inter-school and school-enterprise jointly formulate training programs to improve the education system in open innovation, cooperation, and exchange. The advantage of universities lies in academic normative education. The advantage of enterprises lies in a more accurate grasp of market demand and trends. Enterprises provide students with internship channels as a second classroom

form, which also plays a positive role in promoting the first classroom teaching in school. Tutors inside and outside the school jointly guide students' learning, scientific research, and practice, so as to jointly nurture high-level compound innovative talents with innovative thinking and innovative ability.

3.2.4 Teaching methods: platform-based teaching

Focusing on the original intention and mission of "educating people for the Party and cultivating talents for the country", colleges and universities should take moral education as their primary responsibility and actively explore new paths suitable for the education of compound innovative talents. In the face of the problems of large differences, large spans, and uneven development in talent training in colleges and universities in the past, colleges and universities should continue to promote the implementation of policies for the development of educational informatization. Vigorously develop "Internet + education", use platform-based teaching methods to make up for shortcomings, promote balance and improve quality, promote all students to share high-quality resources under the same blue sky, and strive to achieve educational equity. Platform-based thinking provides a path to solve the demand for academic resource sharing. According to different teaching objectives and teaching contents, the platform is divided into two categories: an academic resource sharing platform and a practical teaching platform. First, building a college academic resource sharing platform to support interactions between colleges and universities at different levels, regions, and majors is an important channel to promote inter-school alliances and student exchanges. our country has a vast geographical area and a large population. There is a large gap in educational informatization between universities, a low level of resource sharing, and a serious "information island" phenomenon between educational information systems. Therefore, our country has continuously emphasized the top-level design of educational informatization and the construction of online teaching platforms to promote the balance of educational resources and promote the modernization and high-quality reform and development of education [12]. our country has more than 31 universities, including Tsinghua University, Peking University, Nanjing University, and Tianjin University, taking the lead in planning, and jointly with scientific research institutes, enterprises, and local governments, established 167 "collaborative innovation center" platforms to meet the needs of multidisciplinary cross-compound innovative talent training models. This platform supports universities in forming high-level teaching staff, formulating scholar mobility mechanisms, and sharing teaching resources. Second, build a practical teaching platform to remove obstacles to school-enterprise cooperation from the institutional and channel perspectives. Establish student innovation and entrepreneurship science and technology parks, school-enterprise joint research institutes, and other physical supports, and establish school-enterprise innovation and entrepreneurship competitions, cooperation funds, internship exchanges, and other multi-channel in-depth cooperation to promote the practical application and landing transformation of university scientific research and knowledge achievements.

4. Conclusion

The new round of scientific and technological revolution and industrial transformation has a more urgent demand for compound innovative talents. Colleges and universities have proposed or tried to set a beautiful goal of cultivating compound innovative talents. However, at present, the academic community and society have not yet unified their understanding of the concept and connotation of compound innovative talents. In addition, whether the existing course arrangements and teaching content of compound innovative talents respect the needs of students' future career development, whether they effectively improve students' diversified knowledge reserves and comprehensive quality capabilities, and whether they meet the national strategic needs still need to be rigorously investigated and demonstrated. In order to standardize the talent training system arrangements and formulate a scientific and practical education system, it is urgent and necessary to explore a teaching model that meets the goal of cultivating compound innovative talents. The EPUI platform teaching model proposed in this paper takes the construction of a good education ecosystem as the starting point, explores what kind of higher education model can adapt to the external environment and resources, and promote the balance of the education system, so as to cultivate a group of young talents that meet the needs of the national innovation development strategy. Therefore, this paper applies the theory of educational ecology to analyze the actual needs of cultivating high-level compound innovative talents in China, and proposes to build an EPUI platform teaching model, aiming to form a combination of theoretical education and scientific research practice, give full play to the advantages and resources of universities and enterprises, promote the organic integration of school education and social needs, and enable multiple subjects such as government, enterprises, industry and society to participate in the teaching process of compound innovative talents. With more and more subjects joining

the educational ecosystem, especially those who can provide differentiated, diversified, and high-quality educational resources, the teaching platform ecosystem can attract more potential subjects to join the platform. The disciplinary progress from within the ecosystem and the technological innovation from outside have enhanced the quality of platform teaching, established a complementary and win-win relationship between universities, enterprises, and the environment, and promoted the continuous transformation and upgrading of the entire university education ecosystem.

Funding

National Natural Science Foundation of China—General Project (Project Approval Number: 71872027; 72172024); 2021 Graduate Teaching and Research Reform Project of the University of Electronic Science and Technology of China.

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