

Cultivating Autonomous Learning Ability of Applied Undergraduate University Students from the Perspective of Innovation Capacity Cultivation

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Abstract: Against the backdrop of the knowledge economy and the information age, societal demands for talent are undergoing profound changes. Cultivating students' autonomous learning ability is a crucial measure for applied undergraduate universities to respond to the needs of economic and social development in the new era and to enhance the quality of talent cultivation. It plays a key role in fostering innovative talents. This study, grounded in the perspective of cultivating innovation capacity, deeply analyzes the logical relationship between autonomous learning ability and innovation capacity. It constructs a pathway for cultivating autonomous learning ability among applied undergraduate university students from three dimensions: the student as the main body, teacher guidance, and institutional support. Through the synergistic collaboration of students, teachers, and the university, a comprehensive and systematic cultivation system can be established, effectively enhancing the autonomous learning ability of applied undergraduate university students and laying a solid foundation for the cultivation of their innovation capacity.

Keywords: Applied Undergraduate Universities; Innovation Capacity; Autonomous Learning Ability; Cultivation Pathway

1. Introduction

Against the backdrop of the knowledge economy era intertwined with the information technology revolution, societal demands for talent are undergoing profound transformations. The intensification of global competition and the accelerating pace of technological iteration mean that mere knowledge transmission can no longer

satisfy the expectations of future society for talent. High-quality applied talents equipped with continuous learning capabilities, critical thinking, and a pioneering and innovative spirit have become the core force driving social progress and industrial upgrading. Applied undergraduate universities, serving as a crucial bridge between higher education and industrial practice, bear the historical mission of cultivating such talents. The core of their educational objectives lies not only in establishing a solid foundation of professional knowledge for students but also in stimulating their inherent innovative potential and fostering the autonomous learning ability necessary for them to adapt to complex and ever-changing future environments and achieve lifelong development.

However, examining current educational practices, some applied undergraduate universities are still, to varying degrees, influenced by the inertia of traditional educational models. The traditional educational model places excessive emphasis on the instruction of knowledge and the drilling of test-taking skills, while paying relatively insufficient attention to the cultivation of students' autonomy, inquiry skills, and self-regulation abilities. This model of "giving fish" rather than "teaching how to fish" somewhat inhibits the development of students' innovative awareness and autonomous learning ability. Students often find themselves in a passive receptive position, lacking comprehensive training in identifying, analyzing, and solving problems, making it difficult to form the core competencies needed to adapt to future social changes. Therefore, exploring an effective pathway to systematically enhance the autonomous learning ability of applied undergraduate university students, grounded in the cultivation of innovation capacity, is of great significance for deepening educational and

teaching reforms, effectively improving the quality of talent cultivation, and strengthening students' core competitiveness in future society.

2. The Logical Relationship between Autonomous Learning Ability and Innovation Capacity

Autonomous learning ability refers to the learner's capacity, driven by intrinsic motivation, to actively set learning goals, select learning strategies, monitor the learning process, evaluate learning outcomes, and effectively utilize learning resources to achieve these goals. It is not only a core competency for individual lifelong development but also the crucial foundation for the generation and development of innovation capacity.

Firstly, autonomous learning ability serves as the foundational condition for generating innovation capacity. Innovation does not emerge from a vacuum; it is built upon a profound understanding of existing knowledge, critical reflection, and interdisciplinary integration. Autonomous learning ability endows individuals with the motivation to continuously explore unknown domains, enabling them to actively pay attention to disciplinary frontiers, track technological trends, and maintain sensitivity and curiosity towards new things. This spirit of active inquiry provides an inexhaustible source for the germination of innovative thinking. Without autonomous learning ability, an individual's knowledge horizon narrows, thinking becomes rigid, and innovation becomes water without a source or a tree without roots.

Secondly, autonomous learning ability provides processual support for the development of innovation capacity. The process of innovation itself is a highly autonomous process of inquiry, requiring individuals to independently identify problems, analyze them, and seek solutions in complex contexts. The core elements encompassed by autonomous learning ability, such as goal setting, strategy selection, self-monitoring, and self-regulation, are precisely the cognitive and non-cognitive skills necessary to complete this inquiry process. The trial, error, reflection, and adjustment students experience during autonomous learning closely align with the perseverance and flexibility required in innovative practice. Through continuous training in autonomous learning, students gradually form a methodological system for identifying and solving problems, laying a

solid practical foundation for the cultivation of innovation capacity.

Thirdly, the development of innovation capacity, in turn, reinforces autonomous learning ability. When students achieve innovative outcomes through autonomous learning, their intrinsic learning motivation and self-efficacy are significantly enhanced, making them more willing to invest in new autonomous inquiry activities, thus forming a virtuous cycle. The enhancement of innovation capacity enables students to examine the learning process from a higher vantage point, clarifies their learning goals and directions, and further optimizes their learning strategies, thereby improving the quality and efficiency of autonomous learning. This mutually reinforcing, spiraling upward relationship reveals the inherent unity between cultivating innovation capacity and cultivating autonomous learning ability.

Therefore, for applied undergraduate universities, considering the cultivation of students' autonomous learning ability within the overarching framework of innovation capacity development is not only an embodiment of implementing the "student-centered" educational philosophy but also a crucial step towards enhancing the connotation of talent cultivation and responding to society's pressing demand for innovative applied talents.

3. Pathways for Cultivating Autonomous Learning Ability of Applied Undergraduate University Students Based on Innovation Capacity Cultivation

Constructing effective pathways for cultivating autonomous learning ability requires moving beyond a singular classroom teaching perspective towards a cultivation system involving the collaborative participation and mutual support of three main entities: students, teachers, and the university [1]. This study explores pathways for cultivating autonomous learning ability among applied undergraduate university students from these three dimensions, aiming to comprehensively cultivate students' autonomous learning ability and enhance their innovation capacity.

3.1 Student Aspect: Self-Motivation and Active Exploration

Students are the main body of autonomous learning, and their intrinsic motivation and self-management ability form the cornerstone of

cultivation. Guided by the goal of cultivating innovation capacity, students should proactively undergo a role transformation and actively assume responsibility for their learning [2].

(1) Strengthening Self-Management and Clarifying Development Goals

Autonomous learning first requires students to have a clear understanding and plan for their own development. The university stage is a critical period for the formation of life values and worldviews, as well as the starting point for their careers. Students should actively engage in career planning, integrating personal interests, professional characteristics, and societal needs to establish phased learning goals and long-term development visions. Based on this, they should formulate detailed study plans, allocate time and energy reasonably, and overcome dependency and procrastination habits. Particularly in professional studies, students should not be satisfied with classroom knowledge but should actively expand their reading, pay attention to industry trends, and integrate theoretical knowledge with practical application, cultivating the ability to transition from "learning to know" to "learning to learn" and then to "learning to use." This goal-oriented self-management is a prerequisite for sustained autonomous learning.

(2) Improving Learning Methods and Enhancing Learning Effectiveness

Effective learning methods are key to improving the efficiency of autonomous learning. Students should become the directors of their own learning processes, actively reflecting on and summarizing learning strategies suitable for themselves. This includes exploring and utilizing efficient learning tools such as mind maps and the Feynman Technique, cultivating skills in information filtering, knowledge integration, and critical thinking. Regularly conducting learning reflections-by writing learning logs, participating in study group discussions, etc.-allows students to check learning outcomes and identify areas for improvement. During reflection, special attention should be paid to cultivating a spirit of inquiry, daring to question existing knowledge and examining issues from different perspectives, which serves as a crucial starting point for innovative thinking. By continuously optimizing learning methods, students can enhance the depth and breadth of their learning, providing a solid cognitive foundation for the formation of innovation capacity.

(3) Enhancing Digital Literacy and Skills,

Expanding Learning Spaces

In the digital age, digital literacy has become an integral component of autonomous learning ability [3]. Digital literacy encompasses the collection of competencies and skills-including information acquisition, creation, usage, evaluation, interaction, sharing, and innovation-necessary for learners to study, work, and live in a digital society. Students should actively adapt to and leverage the learning opportunities brought by information technology, actively enhancing their abilities in information acquisition, evaluation, integration, creation, and sharing. This includes not only mastering the use of various academic databases, online learning platforms, and collaboration tools but, more importantly, cultivating critical information processing skills to sift valuable information from the ocean of data, discern information authenticity, and construct personal knowledge networks. By actively embracing digital learning environments and utilizing resources such as MOOCs, micro-lectures, and academic social networks, students can break through spatial and temporal constraints, broaden their learning horizons, and provide a broader knowledge base for cultivating innovative thinking.

(4) Building a Lifelong Learning System, Focusing on Long-Term Development

Cultivating autonomous learning ability is by no means an overnight task; its ultimate goal is to equip students with the habits and capabilities for lifelong learning. In an era of accelerating knowledge renewal, university students should view their time in university as a critical period for constructing a lifelong learning system. This involves not only learning specific knowledge but, more importantly, learning how to learn and mastering learning methods adaptable to future changes. This implies cultivating intrinsic motivation for continuous learning, viewing learning as a lifestyle and a value pursuit rather than merely a phased task [4]. By establishing personal knowledge repositories, participating in online learning communities, and continuously tracking cutting-edge developments in their fields, students can form a dynamic, open, and sustainably developing personal learning ecosystem, laying a solid foundation for addressing various challenges in future careers and achieving continuous innovation.

3.2 Teacher Aspect: Strengthening Guidance and Support

Teachers play a vital guiding and supporting role in cultivating students' autonomous learning ability. The teacher's role needs to shift from being a traditional knowledge authority and one-way transmitter to an organizer, facilitator, and collaborator in the student learning process.

(1) Forming Interdisciplinary Teaching Teams to Provide Multifaceted Support

Facing the diverse learning needs of students, teaching teams with a single disciplinary background often fall short. Applied undergraduate universities should strive to build interdisciplinary teaching teams composed of experts in theoretical instruction, practical guidance, technical support, and other fields. Theory-focused teachers are responsible for constructing knowledge frameworks and guiding theoretical speculation, providing students with cutting-edge academic trends. Practice-focused teachers help students translate knowledge into abilities to solve practical problems through case studies, project-based exercises, and other methods. Technology-focused teachers guide students in utilizing information technology tools to facilitate efficient learning and knowledge innovation. Through collaborative teamwork and the strategic leveraging of individual strengths, such teams can provide comprehensive, multi-dimensional support for students' autonomous learning, thereby better addressing their individualized and differentiated learning needs.

(2) Innovating Teaching Methods to Stimulate Active Participation

The innovation of teaching methods is a direct driver for stimulating students' willingness to engage in autonomous learning. Teachers should actively explore and implement student-centered teaching models, such as project-based learning, participatory learning, and collaborative learning. Project-based learning cultivates students' abilities to identify, analyze, and solve problems by having them participate in complete project practices. Participatory learning emphasizes student agency, transforming passive reception into active construction. Collaborative learning fosters communication skills and teamwork through group work. These methods transform the learning process from passive reception to active inquiry. As students complete authentic tasks and solve complex problems, they naturally need to set goals, search for information, collaborate in discussions, and engage in self-assessment, thereby effectively

exercising their autonomous learning ability. The teacher's role in this process is to design problem scenarios, provide learning scaffolds, guide the direction of inquiry, encourage students to question and reflect, and facilitate problem-solving through discussion.

(3) Transforming Teaching Concepts and Strengthening Awareness of Autonomy

Transforming teachers' concepts is a prerequisite for deep-seated reform. It should be deeply understood that the highest realm of education is to "teach how to fish"-that is, to teach students how to learn. In teaching, the dominant position of students should be fully respected; students should be encouraged to ask questions, challenge ideas, and engage in debate. Mistakes made during exploration should be allowed and even embraced as valuable learning resources [5]. Teachers should continuously strengthen students' awareness of autonomous learning, making it a habit throughout the learning process. Actively exploring classroom teaching models that allow students to genuinely participate, stimulating their interest in learning, encouraging them to identify problems, and guiding them to analyze and solve problems truly embodies the student-centered principle. Simultaneously, students should be encouraged to develop critical thinking, enabling them to analyze, evaluate, judge, verify, and reflect on information, which is a crucial foundation for cultivating innovation capacity [6].

(4) Emphasizing Process-Oriented Assessment and Improving Evaluation Mechanisms

A scientific evaluation mechanism for autonomous learning ability can help college students build confidence and stimulate learning motivation and interest. Traditional evaluation methods, which focus too heavily on learning outcomes (grades), struggle to fully reflect students' learning processes and ability development. Evaluation criteria should be refined by incorporating process-oriented assessment and multi-party evaluation to effectively assess students' autonomous learning processes from multiple angles and perspectives. Regarding evaluators, a diversified autonomous learning evaluation framework should be constructed, including teacher evaluation, peer evaluation, and self-evaluation. Process-oriented assessment provides timely feedback on students' learning status, helping them adjust their learning strategies. Multi-party evaluation offers a more comprehensive perspective,

promoting student reflection and growth. Through a scientific evaluation mechanism, students are guided to pay more attention to optimizing the learning process and enhancing autonomous learning ability, in addition to focusing on learning outcomes.

3.3 University Aspect: Platform and Resource Construction

As the organizer of educational activities and provider of resources, the university's top-level design and institutional arrangements play a fundamentally supportive role in cultivating autonomous learning ability. The university should prioritize building an ecosystem that supports autonomous learning and encourages innovation as a strategic focus.

(1) Creating an Atmosphere Conducive to Autonomous Learning and Optimizing the Learning Environment.

A favorable learning environment is a powerful guarantee for the effective implementation of autonomous learning. In terms of physical environment, the university should strive to improve the infrastructure conditions for autonomous learning, providing students with comfortable and convenient spaces for self-study. For example, the library should regularly purchase relevant books and materials based on students' autonomous learning needs; study rooms should maintain appropriate lighting and temperature to foster a conducive learning atmosphere [7]. In terms of the soft environment, the university should strengthen faculty development to enhance teachers' ability to guide student autonomous learning; adjust curriculum design to fully consider students' needs for autonomous learning, granting them appropriate free time and space for self-study to stimulate intrinsic motivation; and strengthen the cultivation of academic atmosphere and conduct, emphasizing the importance of autonomous learning through advocacy, role models, and other means, fostering a school culture that values autonomy and encourages exploration. Through the synergistic construction of physical and soft environments, the university provides comprehensive support for cultivating students' autonomous learning ability [8].

(2) Developing Digital Learning Resources and Enriching Learning Media

High-quality digital learning resources are crucial support for student autonomous learning. Through the development of digital learning

resources, the university can provide students with diverse learning media, enabling them to engage in autonomous learning according to their needs. High-quality digital learning resources not only attract students to learn more actively but also provide valuable course references for teachers. The development of digital learning resources should align with students' learning habits, effectively designing resources according to different stages of learning-pre-class preparation, in-class learning, and post-class review-to meet students' needs across various phases of the learning process. Resource formats should include videos, audio, documents, interactive courseware, and other forms to make the learning experience more engaging and dynamic, thereby enhancing student participation and learning effectiveness [9].

(3) Deepening Online Education and Teaching Reform, Innovating Teaching Models

Online education serves as a crucial front for cultivating students' autonomous learning ability in a digital environment. The university should build online platforms for teaching exchange, encouraging teachers to communicate and collaborate online, develop teaching resources across institutions, and achieve resource sharing and integration. Through online communication, pairing for mutual assistance, and other methods, teaching plans can be refined, teachers' ability to engage in online collaborative research can be enhanced, and a team of educators with more advanced teaching concepts and higher digital literacy can be cultivated. Innovating online teaching models, emphasizing the application of online teaching resource repositories, and adhering to the principle of "integrating construction and application," the university can leverage "Internet+" information technology to introduce and enhance digital teaching platforms, promoting the effective integration of teaching resources and processes [10]. Teachers should be guided to implement virtual simulation teaching reforms and promote new teaching models utilizing information technologies such as artificial intelligence and virtual reality, continuously improving teaching quality and student learning experiences.

(4) Building an Industry-Education Integration Collaborative Education Platform to Strengthen Practical Abilities

Industry-education integration is a distinguishing feature of applied undergraduate universities and

a crucial pathway for cultivating students' practical abilities and innovative spirit. High-level platforms for industry-education integration should be constructed for different professional clusters, comprehensively considering factors such as professional characteristics and teaching functions, and incorporating university-local cooperation, regional sharing, and enterprise service as different types of practical teaching. Efforts should be made to create simulated real-work environments within on-campus practice bases as specific platforms for implementing industry-education integration teaching, inviting relevant business personnel to campus to co-organize teaching, allowing students to exercise their practical abilities in authentic or simulated work settings [11]. Project-based practical teaching combining research and instruction should be implemented, collaborating with relevant regional departments to co-innovate project-based teaching and share product development teaching outcomes. Based on content differences, practical teaching should be distinguished from theoretical teaching, fully considering factors such as professional job requirements, practical skill enhancement, and student professional literacy cultivation, establishing a teaching system integrating teaching, learning, and doing. This requires students to work in groups, assume different role responsibilities, complete various job requirements within limited timeframes, and master essential skills for career development, thereby providing a solid practical foundation for cultivating innovation capacity.

4. Conclusion

Cultivating autonomous learning ability among university students is an essential pathway for achieving the goal of cultivating innovative talents and responding to the needs of economic and social development in the new era. This task is particularly urgent for applied undergraduate universities. This study, grounded in the perspective of cultivating innovation capacity, deeply analyzed the logical relationship between autonomous learning ability and innovation capacity and systematically constructed a multi-dimensional cultivation pathway comprising three levels: students, teachers, and the university.

At the student level, emphasis is placed on students strengthening self-management and

clarifying development goals; improving learning methods and enhancing learning effectiveness; enhancing digital literacy and skills to expand learning spaces; and building a lifelong learning system with a focus on long-term development. At the teacher level, requirements include forming interdisciplinary teaching teams to provide multifaceted support; innovating teaching methods to stimulate active participation; transforming teaching concepts to strengthen awareness of autonomy; and emphasizing process-oriented assessment to improve evaluation mechanisms. At the university level, the institution should create an atmosphere conducive to autonomous learning and optimize the learning environment; develop digital learning resources to enrich learning media; deepen online education and teaching reform to innovate teaching models; and build an industry-education integration collaborative education platform to strengthen practical abilities.

These three levels—students, teachers, and the university—do not operate in isolation but form an organic whole where they mutually influence and reinforce each other. The student's agency acts as the intrinsic driving force, the teacher's guidance serves as crucial support, and the university's platform construction provides the foundational guarantee. Only through the synergistic collaboration of these three parties, forming a cohesive force, can a systematic and efficient system for cultivating autonomous learning ability be truly established, effectively enhancing university students' autonomous learning ability and laying a solid foundation for the sustainable development of their innovation capacity.

Acknowledgments

This study was supported by the Research and Practice Project of Research-Based Teaching Reform in Henan Province: "Innovation and Practice of Research-Based Teaching Reform for Logistics Management Major Empowered by Digital Intelligence" (Project No. 154); the 2025 Intelligent Course of Xinyang Agriculture and Forestry University, "Purchasing Management" (Project No. 2025ZHKC041); the 2026 Education and Teaching Reform Research and Practice Project of Xinyang Agriculture and Forestry University, "Ideological and Political Infiltration· Digital Intelligence Empowerment· Industry-Education Symbiosis:

A Systematic Reform Study on the Talent Cultivation Model for Logistics Management”(Project No. 2026XJGGJ31);and the 2026 Education and Teaching Reform Research and Practice Project of Xinyang Agriculture and Forestry University, "AI-empowered Industry-Education-Research Integration in Logistics System Analysis and Design for New Quality Productive Forces" (Project No. 2026XJGGJ63).

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