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A Talent Cultivation Model for Science and Technology Service Sector Based on the Concept of Learning Progressions

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Abstract: This article focuses on the training of scientific and technological service talents. Based on the analysis of the disadvantages of the traditional training model, it introduces the concept of advanced learning, aiming at building a scientific and effective new talent training model. By using the methods of literature research and theoretical analysis, this article probes into the advanced theory of learning and the related theory of scientific and technological service personnel training. Accordingly, from the aspects of training objectives, curriculum system design, teaching methods and means, a training model based on the concept of advanced learning is constructed, and an implementation guarantee mechanism covering the construction of teaching staff, the support of teaching resources and the quality evaluation system is put forward. The research shows that the new model can cultivate students' ability in stages and at multiple levels, the curriculum system is gradual, and the teaching methods meet the needs of the concept. The research conclusion provides new ideas for the training of scientific and technological service talents, which is helpful to improve the quality of talent training and better meet the demand of professional talents for industry development.

1. Introduction

Under the background of the rapid development of science and technology and the transformation and upgrading of economic structure, the science and technology service industry, as a key force to promote innovation-driven development, is showing a vigorous development trend [1]. The demand for professionals in this industry not only keeps increasing in quantity, but also puts forward brand-new and strict requirements in quality and ability structure [2]. The traditional training mode of science and technology service talents generally focuses on the one-way transfer of knowledge, and gradually exposes many drawbacks in the advanced training of talent ability and the fit with the actual needs of the industry, which is difficult to meet the complex and ever-changing development needs of the current science and technology service industry [3].

As a theory that has attracted much attention in the field of education in recent years, the advanced concept of learning provides a new idea for solving the above difficulties [4]. This concept emphasizes that students gradually understand and master specific knowledge and skills at

different stages, forming a coherent and progressive learning path [5]. Introducing the advanced learning concept into the training of scientific and technological service talents is expected to break the limitations of the traditional training mode and build a more scientific, systematic training mode that conforms to the law of talent growth.

This article focuses on the training mode of scientific and technological service talents based on the concept of advanced learning. The purpose of this article is to systematically construct a scientific and reasonable training model by analyzing the connotation and elements of advanced learning concept and combining the actual demand of science and technology service industry for talent ability. It covers many key links, from the precise setting of training objectives, to the optimal design of curriculum system, to the innovative application of teaching methods and the comprehensive construction of guarantee mechanism. It is expected that through this study, it will provide theoretical reference with practical guiding significance for the cultivation of scientific and technological service talents, help improve the quality of scientific and technological service talents, and better meet the talent demand of industry development.

2. Learning advanced theory

Advanced learning theory aims to describe the continuous and in-depth process of students' understanding of a core concept or theme and skills development in a time span [6]. It is not a simple accumulation of knowledge, but a reconstruction and expansion of cognitive structure. The National Research Council of the United States defines learning advancement as "a hypothetical description of students' way of thinking about a learning topic along a clearly defined path in a large time span".

Advanced learning usually includes five key elements, advanced variables, that is, the core concepts or abilities that students gradually develop in the learning process. Advanced level is divided into different stages according to students' understanding and mastery of advanced variables. Achievement expectations clearly define the performance standards that students should achieve at various advanced levels. Assessment tools are used to measure the advanced level of students. Learning path, connecting the sequence of teaching activities at all advanced levels. The development of this theory stems from the in-depth study of students' learning rules, emphasizing that learning is a dynamic and nonlinear process, and students will understand knowledge in a unique way at different stages, and their cognitive development has stages and continuity [7]. This provides an important enlightenment for the cultivation of scientific and technological service talents, that is, the cultivation of talents should follow the principle of gradual progress and design teaching according to the cognitive characteristics of students at different stages.

3. Science and technology service personnel training related theory

Scientific and technological service talents refer to compound talents who have solid scientific and technological professional knowledge and skilled service skills and can provide all-round support for scientific and technological innovation activities [8]. Its ability structure covers professional knowledge, technical application, communication and cooperation, problem solving and many other aspects.

In terms of the principle of training talents in science and technology services, the first is the demand-oriented principle, and the training objectives and contents are determined closely around the actual needs of the science and technology service industry to ensure that talents are marketable [9]. Secondly, it is the practice-oriented principle, which emphasizes the key position of practical teaching in talent training, and improves students' practical operation ability through internship, training and other activities [10]. Thirdly, the principle of innovation and development focuses on

cultivating students' innovative thinking and ability to adapt to the rapid changes in the science and technology service industry. These theories have laid a solid foundation for the construction of the training mode of science and technology service talents based on the advanced concept of learning, so that the construction of the new mode can not only follow the law of talent learning and cognitive development, but also closely meet the actual needs of the industry for talents.

4. Construction of training mode based on advanced learning concept

4.1. Training goal setting

Based on the concept of advanced learning and the needs of science and technology service industry, a phased and multi-level talent training target system is set. The primary stage focuses on cultivating students' knowledge and mastery of basic concepts, industry norms and general skills of scientific and technological services. At this stage, students should be able to understand the basic categories of scientific and technological services and be familiar with common terms and operating procedures in the industry. The intermediate stage requires students to deeply understand professional knowledge and apply it to practical problem solving. Students need to have certain project execution ability and be able to independently complete some scientific and technological service tasks [11]. The advanced stage focuses on cultivating students' innovative ability and comprehensive management ability, so that they can lead the team to carry out complex scientific and technological service projects and meet the frontier challenges of the industry.

4.2. Curriculum system design

Guided by advanced learning, we will build a gradual and spiraling curriculum system (see Table 1, Curriculum System for Technology Service Talents Based on Learning Progression). The selection and organization of course content closely revolves around the training goal, from basic to professional, from theory to practice. At the basic course level, courses such as "Introduction to Science and Technology Service" and "Information Technology Foundation" are set up to help students build a knowledge framework and get in touch with basic knowledge of the industry. With the deepening of study, courses such as "science and technology project management" and "intellectual property service" are offered in the professional course stage to strengthen students' professional skills. The practice course runs through, and the junior students arrange basic experiments and simulation projects, while the senior students participate in enterprise practice and real project practice.

Table 1: Curriculum System for Technology Service Talents Based on Learning Progression

Course Stage	Course Name	Course Objectives
Foundational Courses	Introduction to Technology Services	Introduce the overall landscape, development history, and basic concepts of the technology service industry
Foundational Courses	Fundamentals of Information Technology	Teach computer operations, office software, and basic programming knowledge
Professional Courses	Technology Project Management	Enable students to master project management processes, methods, and tools
Professional Courses	Intellectual Property Services	Provide in-depth explanations of intellectual property-related laws, regulations, and service processes
Practical Courses (Lower Grades)	Basic Experimental Courses	Consolidate theoretical knowledge through simple experiments and cultivate basic operational skills
Practical Courses (Upper Grades)	Enterprise Internships and Real Project Practices	Allow students to apply knowledge in actual work environments and enhance their comprehensive abilities

4.3. Teaching methods and means

In order to conform to the advanced concept of learning, various teaching methods are adopted. Project-based learning method is widely used in professional course teaching. For example, in the course of "Science and Technology Project Management", teachers set actual project situations, and students complete project planning, implementation and evaluation in groups, so as to understand project management knowledge and skills in practice. Inquiry learning method is suitable for cultivating students' innovative thinking. In some courses in the frontier science and technology service field, teachers ask open questions, guide students to explore independently, consult materials and propose solutions, and improve students' ability to solve complex problems. The full utilization of modern information technology provides strong support for teaching, among which online learning platforms provide rich learning resources, enabling students to engage in self-directed learning and interactive communication anytime and anywhere; Virtual laboratory provides students with a simulated practice environment to make up for the shortage of practical teaching resources.

5. Guarantee mechanism for the implementation of training mode

5.1. Construction of teaching staff

Talent cultivation based on the concept of advanced learning puts forward higher requirements for teachers' ability. Teachers should not only have solid professional knowledge, but also deeply understand advanced learning theory and master diversified teaching methods. In order to build a qualified teaching staff, on the one hand, teachers are encouraged to participate in relevant training and academic seminars, and the educational concept and knowledge system are updated in time. For example, teachers are regularly organized to participate in special training for learning advanced theories, and educational experts are invited to give lectures and guidance. On the other hand, schools should actively promote teachers' participation in practical activities of enterprises, so that teachers can have a deep understanding of the actual needs and development trends of the technology service industry, and effectively integrate these industry typical cases into the daily teaching process. In addition, it is also very important to establish an incentive mechanism for teachers. Reward teachers who have performed well in teaching reform, curriculum construction and guiding students' practice, and stimulate teachers' enthusiasm and creativity. At the same time, the introduction of enterprise experts with rich industry experience as part-time teachers, enrich the teaching staff and optimize the teaching structure.

5.2. Teaching resources support

Table 2: Planning Table for Teaching Resource Support

Resource Type	Specific Measures	Time Planning
On-campus Hardware Resources	Upgrade laboratory equipment and establish an intelligent technology service training center	Within the next 1-2 years
On-campus Literature Resources	Add 50 new professional books related to technology services annually and expand database resources	Continuously carried out each year
Off-campus Cooperative Resources	Establish cooperative relationships with more than 10 well-known technology service enterprises and jointly build internship bases	Within the next 3 years
Online Educational Resources	Screen and introduce 10 high-quality online courses	Within the next 1 year

The systematic integration of on campus and off campus resources provides comprehensive

support for the implementation of training modes. The school has increased investment in hardware facilities such as laboratories and training bases, and built a practical teaching platform that meets the standards of the technology service industry. The library continues to expand its professional books, journals, and database resources in the field of technology services, providing rich reference materials for teachers and students. Off campus technology service companies have established long-term and stable cooperative relationships with schools, and the jointly built internship bases provide students with real practical scenarios and project opportunities. The full utilization of online educational resources has further expanded learning channels, and the introduction of high-quality online courses has improved the teaching resource system. The following is the specific planning of teaching resources support (see Table 2 "Planning Table for Teaching Resource Support").

5.3. Quality evaluation system

A quality evaluation system for talent cultivation based on advanced learning concepts should be constructed to ensure the effective implementation of the training mode. Evaluation indicators not only pay attention to students' knowledge mastery, but also pay attention to their ability development and literacy improvement. Based on the different stages of advanced learning, the corresponding evaluation standards are formulated. In the primary stage, students' understanding of basic knowledge and proficiency in the operation of basic skills are mainly evaluated; In the intermediate stage, students' ability to use knowledge to solve problems in project practice is emphasized; In the advanced stage, we should pay attention to students' innovative ability, team leadership ability and grasp the frontier issues of the industry.

The evaluation methods are diversified, including examination, homework, project report, practical operation assessment and enterprise evaluation. Schools should establish a regular feedback mechanism and regularly collect evaluation opinions from students, teachers, and cooperative enterprises. These feedback information will be used for dynamic adjustment and continuous optimization of training modes, thereby promoting steady improvement in the quality of talent cultivation. Through the perfect quality evaluation system, the training mode of scientific and technological service talents based on the advanced concept of learning can achieve the expected goal and deliver high-quality professionals for the industry.

6. Conclusions

This article focuses on the training mode of scientific and technological service talents based on the concept of advanced learning. With the rapid development of science and technology service industry, it is of great significance to integrate the concept of advanced learning into talent training. By combing the relevant theoretical basis, this article clarifies the principles and requirements of learning advanced theory and training scientific and technological service talents, and provides theoretical support for the construction of a new model. On this basis, the construction of the training mode is guided by setting the training objectives in stages and at multiple levels, creating a gradual and spiral curriculum system, and adopting project-based and inquiry-based teaching methods and means. At the same time, the proposed guarantee mechanism guarantees the effective implementation of the training model from three aspects: the construction of teachers, the support of teaching resources and the quality evaluation system.

There are still some limitations in this study. In the aspect of practical verification of training mode, large-scale empirical research has not been carried out, and its practical application effect needs to be further tested. Future research may consider selecting some colleges or training institutions for pilot application, collecting practical data, deeply analyzing the problems existing in the actual operation of the new model and optimizing it. With the continuous development of

science and technology service industry, the demand for talents' ability will also change constantly. It is necessary to pay continuous attention to the industry trends and adjust and improve the training mode in time to ensure that the training of science and technology service talents always meets the development needs of the industry.

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